REPORT RESUMES

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THE EFFECT OF FOUR PROGRAMS OF READING INSTRUCTION WITH VARYING EMPHASIS ON THE REGULARITY OF GRAPHEME-PHONEME CORRESPONDENCES AND THE RELATION OF LANGUAGE STRUCTURE TO MEANING ON ACHIEVEMENT IN FIRST GRADE READING.

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THE PRIMARY OBJECTIVE OF THE STUDY WAS TO INVESTIGATE THE EFFECT UPON WORD RECOGNITION AND READING COMPREHENSION SKILLS OF FOUR READING PROGRAMS. THESE PROGRAMS VARIED IN (1) THE DEGREE OF REGULARITY OF GRAPHEME-PHONEME CORRESPONDENCES PROGRAMED INTO THE VOCABULARY PRESENTED AND (2) THE EMPHASIS ON LANGUAGE STRUCTURE AS RELATED TO MEANING. FOUR EXPLORATORY QUESTIONS WERE DEVELOPED TO STUDY THE RELATIONSHIP BETWEEN THE INDEPENDENT BACKGROUND VARIABLES OF MENTAL AGE, SOCIOECONOMIC STATUS, SEX, AND CHRONOLOGICAL AGE AND THE DEPENDENT VARIABLES OF WORD RECOGNITION AND READING COMPREHENSION. STUDENTS FROM 24 FIRST-GRADE CLASSROOMS WERE GIVEN 2 EXISTING READING PROGRAMS AND 2 PROGRAMS DEVELOPED TO MEET THE SPECIFIC NEEDS OF THIS STUDY. IT WAS CONCLUDED THAT THE FIRST-GRADE READING PROGRAMS POSSESSING A HIGH DEGREE OF CONSISTENCY IN GRAPHEME-PHONEME CORRESPONDENCES PRODUCED SIGNIFICANTLY HIGHER (1) WORD READING, (2) WORD STUDY DRILLS, AND (3) REGULAR WORD IDENTIFICATION ACHIEVEMENT THAN THOSE PROGRAMS OFFERING LITTLE PROVISION FOR CONSISTENT CORRESPONDENCES. THE NEED FOR MORE CAREFULLY DESIGNED LONGITUDINAL READING RESEARCH STUDIES WAS DISCUSSED. (GD)

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University of California
Berkeley, California
1965

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Finally, the writer is especially grateful to his wife for the encouragement, understanding attitude, and help provided while she was directing her own third grade classroom.

R.B.R.

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CHAPTER I

INTRODUCTION

Linguists and psychologists have recently generated numerous hypotheses with direct implications for the teaching of language skills. This is evident from the national meetings of scholars in these related disciplines with language educators during the past two years,[1] related publications which have recently appeared in professional journals,[2] the recent publication of textbooks,[3] and the development of new classroom materials for reading instruction.[4] These hypotheses must be tested in elementary classrooms in experimentally controlled settings over a substantial period of time if progress is to be made in understanding the influence of specific variables on language achievement. The significance of this study in contributing to this goal lies in its provision for increased insight into specific factors in programs of beginning reading instruction and related language variables of children which may contribute to the improvement of primary grade reading achievement.

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[1] Ferguson, C. A., "Seven Statements About the Teaching of Reading," *Ling. Reporter* 5:5-6, April 1963; Steinberg, Erwin R., and William A. Jenkins, "Needed Research in the Teaching of the Elementary School Language Arts," *Elem. Eng.* 39:790-93, December 1962; Strickland, Ruth G., *The Contribution of Structural Linguistics to the Teaching of Reading, Writing, and Grammar in the Elementary School*, 44 pp.

[2] Allen, Robert L., "Better Reading Through the Recognition of Grammatical Relations," *The Reading Teacher* 18:194-98, December 1964; Squire, James R., "New Directions in Language Learning," *Elem. Eng.* 39:535-44, October 1962; Ruddell, Robert B., "In a Time of Transition We Seek New and Better Ways to Teach Reading," *Calif. Teachers Assn. J.* 61:15-16, 56-64, October, 1965.

[3] Fries, Charles C., *Linguistics and Reading*, 265 pp.; Lefevre, Carl A., *Linguistics and the Teaching of Reading*, 252 pp.

[4] Bloomfield, Leonard, and Clarence L. Barnhart, *Let's Read*, 465 pp.; Buchanan, Cynthia Dee, *Programmed Reading*; Ruddell, Robert B., "The Effect of Four Programs of Reading Instruction With Varying Emphasis on the Regularity of Grapheme-Phoneme Correspondences and the Relation of Language Structure to Meaning on Achievement in First-Grade Reading--A First Progress Report," *Psycholinguistic Nature of the Reading Process* (in press); Stolpen, Beula, Priscilla Tyler, and Eleanor Pounds, *Linguistic Block Series*, 8 pp.

Statement of the Problem

The purpose of this study was to provide deeper insight into pertinent factors in beginning reading instruction which affect first grade children's reading achievement. The primary objective of the study was to investigate the effect on word recognition and reading comprehension of published and specially prepared reading programs varying in (a) the degree of regularity of grapheme-phoneme correspondences programmed into the vocabulary presented and (b) the emphasis on language structure as related to meaning.

Four programs were evaluated in this study:

(1) Program B--A basal reading series with little provision for consistent grapheme-phoneme correspondences in the vocabulary introduced and little provision for emphasis on language structure as related to meaning.[5]

(2) Program P--A set of programmed reading materials with vocabulary utilizing consistent grapheme-phoneme

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[5] Sheldon, William D., and others, Sheldon Basic Reading Series.

correspondences to a high degree but placing little emphasis on language structure as related to meaning.[6]

(3) Program B+--A basal reading series (Program B) supplemented by materials designed to build an awareness and understanding of language structure as related to meaning.

(4) Program P+--A set of programmed reading materials (Program P) supplemented by materials designed to build an awareness and understanding of language structure as related to meaning.

The secondary consideration of the investigation encompassed a study of the relationship of selected language and background variables of first grade children to their reading achievement in each of the four reading programs. The language variables consisted of specific aspects of the children's morphological and syntactical language systems. The background variables included mental age, socioeconomic status, sex, and chronological age.

This study must be viewed as differing considerably from earlier studies of this type because of the nature of the reading programs, excepting the basal reader program, and the consideration of selected aspects of the children's morphological and syntactical systems. Recent applications from the field of linguistics have enabled authors to prepare reading materials with greater control over grapheme-phoneme correspondences in the vocabulary utilized and have provided for detailed descriptions of language structure used in oral and written language. Psycholinguists have recently perfected testing instruments to study specific aspects of the development of children's morphological and syntactical systems; these have been utilized in this study in measuring selected aspects of the language variables.

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[6] Buchanan, op. cit.

Hypotheses of the Study

The following experimental hypotheses were developed to guide the planning of the study.

(1) The first grade reading programs possessing a high degree of consistency in grapheme-phoneme correspondences in the vocabulary introduced (Program P and Program P+) will result in significantly higher (a) word reading, (b) word study skills, and (c) regular word identification achievement scores than the reading programs making little provision for consistent correspondences (Program B and Program B+). A related hypothesis stated that the first grade reading programs making little provision for consistent correspondences (Program B and Program B+) will result in significantly higher irregular word identification achievement scores than the reading programs possessing a high degree of consistency in grapheme-phoneme correspondences in the vocabulary introduced (Program P and Program P+).

(2) The first grade reading programs placing special emphasis on language structure as related to meaning (Program B+ and Program P+) will result in significantly higher (a) paragraph meaning comprehension, and (b) sentence meaning comprehension achievement scores than the reading programs placing

no special emphasis on language structure as related to meaning (Program B and Program P).

(3) Paragraph meaning comprehension, sentence meaning comprehension, and vocabulary achievement of first grade subjects at the end of grade one are a function of the control which the subjects exhibit over designated aspects of (a) their morphological language system, and (b) their syntactical language system at the beginning of grade one.

The following exploratory questions were designed to investigate the effect of subject background variables on word recognition and comprehension scores in each of the reading programs studied.

(1) Are there significant differences in (a) word recognition and (b) reading comprehension scores in the different reading programs among children of different mental age?

(2) Are there significant differences in (a) word recognition and (b) reading comprehension scores in the different reading programs among children of different levels of socioeconomic status?

(3) Are there significant differences in (a) word recognition and (b) reading comprehension scores in the different reading programs among children of different sex?

(4) Are there significant differences in (a) word recognition and (b) reading comprehension scores in the different reading groups among children of different chronological age?

Definition of Terms

The following terms will be used in the study according to the accompanying definitions.

High degree of consistency in grapheme-phoneme correspondences. The high degree of consistency refers to the control of the regularities of grapheme-phoneme correspondences in the vocabulary presented. This control is operationally defined by the introduction and sequencing of correspondences in Program P.

Low degree of consistency in grapheme-phoneme correspondences. The low degree of consistency refers to the absence of emphasis on controlling the regularity of grapheme-phoneme correspondences in the vocabulary presented. This control is operationally defined by the introduction and sequencing of correspondences in Program B.

Emphasis on language structure as related to meaning. The emphasis on language structure as related to meaning refers to the presentation of a variety of basic patterns of language structure in which the relationship of words and word groups to meaning change is stressed. Operationally this emphasis is defined by the supplementary aspect (+) of Program B+ and of Program P+.

Program B. Program B refers to the Allyn-Bacon Basal Reading Series, which makes little provision for consistent grapheme-phoneme correspondences in the vocabulary introduced and little provision for emphasis on language structure as related to meaning. A more extensive description of this program may be found in Chapter III.[7]

Program P. Program P refers to the McGraw-Hill Reading Series, a set of programmed reading materials with vocabulary utilizing consistent grapheme-phoneme correspondences to a high degree but placing little emphasis on language structure as related to meaning. A more extensive description of this program may be found in Chapter III.[8]

Program B+. Program B+ refers to a basal reading series (Program B) supplemented by materials designed to build an awareness and understanding of language structure as related to meaning. A more extensive description of this program may be found in Chapter III.

Program P+. Program P+ refers to a set of programmed reading materials (Program P) supplemented by materials designed to build an awareness and understanding of language structure as related to meaning. A more extensive description of this program may be found in Chapter III.

Word reading. Word reading refers to a measure of the subject's ability to select the correct word representing a picture from a multiple-choice item of four words. This was a subtest of the Stanford Achievement Test.[9]

Word study skills. Word study skills refers to the subject's ability to identify initial and final consonant correspondences in word contexts read by the examiner, the identification of a series of words read by the examiner, and the identification of words that rhyme with those read by the examiner. This was a subtest of the Stanford Achievement Test.[10]

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[7] Sheldon and others, op. cit.

[8] Buchanan, op. cit.

[9] Kelley, T. L., and others, Stanford Achievement Test, Primary I, Form X.

Regular word identification. Regular word identification refers to the subject's ability to pronounce words possessing "short" vowel correspondences, "long" vowel correspondences as signaled by the final e and the initial letter in diagraphs, "long" vowel sounds as related to the "open syllable" rule, and the diphthongs. This variable was measured by the Phonetically Regular Words Oral Reading Test designed by a committee working with the Coordinating Center at the University of Minnesota.[11]

Irregular word identification. Irregular word identification refers to the subject's ability to decode words possessing irregular correspondences. This variable was measured by the Gates Word Pronunciation Test.[12]

Paragraph meaning comprehension. Paragraph meaning comprehension refers to the subject's ability to respond to connected discourse by selecting the proper response to a deleted word from four possible items. This was a subtest of the Stanford Achievement Test.[13]

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[10] Kelley and others, op. cit.

[11] See Appendix B.

[12] See Appendix C.

[13] Kelley and others, op. cit.

Sentence meaning comprehension. Sentence meaning comprehension refers to the subject"s ability to comprehend sentence meaning in written discourse as related to picture items. The following types of grammatical contrasts were evaluated: Mass and count nouns; singular and plural nouns marked by inflections; singular and plural nouns marked by is and are; present progressive tense and past tense; present progressive tense and future tense; affirmative and negative; singular and plural of third person possessive pronouns; subject and object in the active voice; subject and object in the passive voice; and the direct and the indirect object. This variable was measured by the Primary Test of Syntax designed by the investigator.[14]

Vocabulary. Vocabulary refers to a measure of the subject's ability to select the correct word corresponding to a definition presented orally from a multiple-choice item of three words. This was a subtest of the Stanford Achievement Test.[15]

Morphological language development. Morphological language development refers to the subject's oral language ability to produce the plural and two possessives of the noun, the third person singular of the verb, the progressive and past tense, and the comparative and the superlative of the adjective. The ability to produce the derived agentive or compound was also measured. Item responses were scored by following the method described in Berko's research. This variable was measured by utilizing Berko's Test of Morphology.[16]

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[14] See Appendix A.

[15] Kelley and others, op. cit.

Syntactical language development. Syntactical language development refers to the subject's oral language ability to imitate, comprehend, and produce the types of grammatical contrasts previously described in the definition of "sentence meaning comprehension." The item responses were scored by utilizing the "Production" scoring procedure described by Fraser, Bellugi, and Brown. This variable was measured by utilizing Fraser, Bellugi, and Brown's Test of Syntax.[17]

Mental age. Mental age refers to a measure of mental age normally expressed in years and months. In this study, however, the raw score obtained on the Pintner-Cunningham Primary Test of General Ability, Form A, was used to define this variable.[18]

Socioeconomic status. Socioeconomic status refers to the occupational status of parents as classified on the basis of particular occupations. This classification was based on the Minnesota Scale for Paternal Occupations indicating the probable socioeconomic level of children in this study.[19]

Chronological age. Chronological age refers to a measure of a child's life age as expressed in years and months.

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[16] Berko, Jean, "The Child's Learning of English Morphology," _Word_ 14:150-77, 1958.

[17] Fraser, Colin, Ursula Bellugi, and Roger Brown, "Control of Grammar in Imitation, Comprehension, and Production," _J. of Verbal Learning and Verbal Behavior_ 2:121-35, August 1963.

[18] Pintner, Rudolf, and others, _Pintner-Cunningham Primary Test, Form A_.

[19] University of Minnesota, Institute of Child Welfare, _The Minnesota Scale for Paternal Occupations_.

Reading readiness. Reading readiness refers to the development of specific abilities as operationally defined by the Metropolitan Readiness Test, Murphy-Durrell Diagnostic Reading Readiness Test, and the Thurstone Pattern Copying and Identical Forms Test.

Limitations of the Problem

The findings of the study were restricted by the inherent reliability and validity of the instruments used. The generalization of the conclusions of the investigation is limited by the population from which the sample was drawn.

Delimitations of the Problem

The study was delimited to subjects in the twenty-four classrooms selected from the first grade student population of the Oakland Unified School District, Oakland, California. The classrooms were selected to represent a wide range of socio-economic levels in the school district. One hundred and sixty subjects were selected at random from the twenty-four classrooms for use in obtaining individual measures required in testing certain hypotheses. Information relative to this subpopulation has been provided in Chapters III and IV.

Children enrolled in special education classes for the mentally retarded were not included in the sample.

CHAPTER II

RATIONALE AND RELATED RESEARCH

Introduction

The process of learning to read constitutes one of the most difficult tasks a child will ever attempt in his development of verbal abilities. In some manner he must develop associations which will allow him to transform printed forms into meaningful associations. The very nature of the writing system, however, results in a more precise statement than does oral language and consequently places a greater burden on the reader. The reduced redundancy resulting from the inability of the writer to respond to the reader's questions and the lack of supplementary meaning cues (stress, pitch, juncture) in written as compared to oral language demands that the beginning reader possess some understanding of the relationships among the written words encountered.

A basic objective of initial instruction in the basal reading program is to attempt to help the child develop independent word recognition skills. In most cases this is initiated by emphasis on auditory and visual perception skills and the development of a sight vocabulary ranging from approximately 50 to 75 words. At this stage, word form and context clues play an important role in the instructional program. As the child progresses beyond the basic vocabulary in the first grade reading program, emphasis is placed on sound and meaning correspondences of the printed symbols. In most reading programs this is developed at early levels through skills in phonic analysis encompassing initial consonant sounds and is later followed by final consonants and consonant blends. Vowel letter-sound associations are usually considered in the latter part of grade one and in the early levels of grade two. By the end of the second grade and the beginning of the third grade independent word recognition skills become increasingly important because the diversified vocabulary has far surpassed the child's basic sight vocabulary and requires him to decode words independently, using his repertoire of word analysis skills.

Development of First Hypothesis

In present reading programs throughout the United States most teachers rely heavily on a basal or a co-basal reading program. Austin has reported that this is the case in more than 95 per cent of the elementary schools which she studied.[1] These beginning reading materials, for the most part, place little emphasis on the control of the consistency of grapheme-phoneme correspondences in the vocabulary presented in the early stages of the first grade program. This has been shown by Diack in a phonemic analysis of words used in beginning reading materials[2] and by the present writer (unpublished). The inconsistent introduction of sound-symbol correspondences in current reading materials was also emphasized in the following statement developed by linguists, psychologists, and reading specialists in a meeting attended by this investigator at Indiana University in the spring of 1963.

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[1] Austin, Mary C., and Morrison, The First R: The Harvard Report on Reading in Elementary Schools, 269 pp.

[2] Diack, Hunter, Reading and the Psychology of Perception, 155 pp.

> The current "basal readers" which constitute the core of most reading instruction in the United States do not treat the establishment of sound-symbol associations systematically enough and do not pay sufficient attention to the presentation of grammatical patterns. They reflect a serious underestimate of the amount of English which the child has already mastered in his ordinary spoken language. No series of readers or set of supplementary materials currently available is fully satisfactory in these respects.[3]

The beginning reader in most instances already knows the meanings of the individual words which are presented in printed form in first grade reading materials.[4] Anderson and Dearborn note that the beginning reader normally says the word aloud or subvocally. These authors state that "in learning to read, the situation is considerably simplified by the fact that the responses of recognition are already conditioned by the sound of the word. The child needs only to hear himself say the word from the printed symbol to get the same meaning."[5] Edfeldt has shown experimentally with adults that poor readers engage more in silent speech than good readers and that as material increases in difficulty, silent speech increases in all readers.[6]

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[3] Ferguson, C. A., "Seven Statements About the Teaching of Reading," Linguistic Reporter 5:5-6, April 1963.

[4] Smith, Henry P., and Emerald V. Dechant, Psychology in Teaching Reading, 470 pp.; MacKinnon, A. R., How Do Children Learn to Read, 276 pp.

[5] Anderson, Irving H., and Walter F. Dearborn, The Psychology of Teaching Reading, 382 pp.

[6] Edfeldt, Ake W., Silent Speech and Silent Reading, 164 pp.

That children utilize the oral counterpart of the graphic symbol is evident in the observable lip movements common to many beginning readers.

Thus a basic task of reading in the initial stages involves discovering what sort of correlation exists between the printed units and their oral counterparts and how various groups of written words function together to transmit meaning.

Gibson states that a child who is successful in the reading act forms grapheme-phoneme correspondences and that he accomplishes this whether he is aware of it or not.[7] Francis expresses the view that the beginning reader moves from the written symbols through their oral counterpart to the meaning of the communiqué, and that consistent writing-to-speech correlation is most desirable in early stages of reading instruction. The recommendation that initial words be introduced on the basis of grouped consistencies has been proposed by Soffietti,[8] Fries,[9] Smith,[10] Hall,[11] and Bloomfield.[12] These authorities have pointed out that the inconsistencies of the English orthography place a limitation on the acquisition of sound-symbol correspondences as presently developed in reading textbooks.

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[7] Gibson, Eleanor J., and others, "The Role of Grapheme-Phoneme Correspondences in the Perception of Words," The Amer. J. of Psych. 75:554-70, December 1962.

[8] Soffietti, J. P., "Why Children Fail to Read, A Linguistic Analysis," Harv. Ed. Rev. 25:63-84, Spring 1955.

[9] Fries, Charles C., Linguistics and Reading, 265 pp.

[10] Smith, Henry Lee, Jr., Linguistic Science and the Teaching of English, 61 pp.

[11] Hall, Robert A., Jr., Sound and Spelling in English, 34 pp.

[12] Bloomfield, Leonard, Language, 564 pp.

Some support is found for this hypothesis in the research literature. Downing's research[13] and that of Mazurkiewicz[14] on the forty-four character alphabet (designed to present greater sound-symbol consistency in reading material) have shown significant differences in reading achievement favoring the subjects using materials possessing consistent correspondences when compared with subjects using materials which did not provide for such controls. Daniels and Diack reported that with remedial readers superior reading performance was obtained with materials utilizing consistent correspondences in comparison with materials which did not provide for such controls.[15]

A number of studies have evaluated the effectiveness of reading programs which place varying degrees of emphasis on sound-symbol correspondences and related generalizations. Although the results have been inconsistent in various studies, some investigations of the use of phonics approaches have revealed superior results for this method at early grade levels, particularly in word recognition.[16]

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[13] Downing, J.A., "The I.T.A. (Initial Teaching Alphabet) Reading Experiment," The Reading Teacher 18:105-10, November 1964.

[14] Mazurkiewicz, A. J., "Teaching Reading in America Using the Initial Teaching Alphabet," Elem. Eng. 41:766-72, November 1964.

[15] Daniels, J. C., and H. Diack, Progress in Reading, 71 pp.

The first hypothesis of the study thus states: Beginning reading materials exercising a high degree of control over the consistency in grapheme-phoneme correspondences in the vocabulary presented will result in significantly higher word recognition achievement of first-grade readers than reading materials making little provision for the consistency of development of these correspondences.

Development of Second Hypothesis

The high degree of development of first grade children's oral language and the interrelationship between oral language and reading has been recognized in the research literature. Strickland[17] and Loban[18] have shown that oral patterns of language structure of first grade children are well developed. Miller and Ervin have reported on the language development of preschool children demonstrating their control over morphological and syntactical structures.[19]

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[16] Agnew, Donald C., The Effect of Varied Amounts of Phonetic Training on Primary Reading, 50 pp.; Bear, D. E., "Phonics for First Grade: A Comparison of Two Methods," Elem. School J. 59:394-402, 1958; Kelley, Barbara Cline, "The Economy Method Versus the Scott-Foresman Method in Teaching Second Grade Reading in the Murphysboro Public Schools," J. of Ed. Research 51:465-69, 1958; Sparks, Paul E., and Leo C. Fay, "An Evaluation of Two Methods of Teaching Reading," Elem. School J. 57:386-90, April 1957.

[17] Strickland, Ruth G., The Language of Elementary School Children: Its Relationship to the Language of Reading Textbooks and the Quality of Reading of Selected Children, 131 pp.

[18] Loban, Walter D., The Language of Elementary School Children, 92 pp.

Loban concluded from his longitudinal study of children's language that the children who were high in general language ability, based on teacher's ratings of oral language and vocabulary socres, were also high in reading ability. The children who were low in general language ability were also low in reading ability.[20] Strickland reported that children who ranked high in silent reading comprehension made more use of common structural patterns, movables and elements of subordination, and elaboration than did children who ranked low on these variables.[21] A high relationship between reading and listening comprehension was noted by Larsen and Feder[22] and by Young.[23] Gibbons found a close relationship between reading and language skills. She observed that a close association existed between the reading level of the children and their ability to understand the structure of sentences.[24]

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[19] Miller, Wick R., and Susan Ervin, "The Development of Grammar in Child Language," (original manuscript) to be published in First Language Acquisition, Child Development Monographs, Spring 1964.

[20] Loban, op. cit.

[21] Strickland, op. cit.

[22] Larsen, Robert P., and Daniel D. Feder, "Common and Differential Factors in Reading and Hearing Comprehension," J. of Ed. Psych. 31:241-52, April 1940.

[23] Young, William E., "The Relation of Reading Comprehension and Retention to Hearing Comprehension and Retention," J. of Experimental Ed. 5:30-39, September 1936.

[24] Gibbons, Helen D., "Reading and Sentence Elements," Elem. Eng. Rev. 18:42-46, February 1941.

Thorndike concluded from an early study that reading constitutes a process of evaluation of the relative degree of importance existing between words, phrases, and sentences in the reading material.[25] Miller observed that "once we have learned the patterns of a language, we can deduce a great deal about a new word or phrase by the way it turns up in familiar patterns."[26] Recent research by the writer has shown that children's reading comprehension socres at the fourth-grade level are significantly higher on reading passages using only high frequency patterns of their oral language structure when compared to reading passages encompassing only low frequency patterns of their oral language structure.[27] MacKinnon observed that beginning readers attempted to substitute syntactic patterns which they had previously read and were familiar with in place of unfamiliar patterns in attempting to decode new reading material.[28] Assuming that the child gains increasing control over his ability to decode graphic symbols and language patterns as he progresses through the grades, it would seem possible that syntactic patterns of language structure have even more effect on the reading comprehension of the beginning reader.

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[25] Thorndike, E. L., "Reading and Reasoning: A Study of Mistakes in Paragraph Reading," J. of Ed. Psych. 8:323-32, 1917.

[26] Miller, George A., Language and Communication, 298 pp.

[27] Ruddell, Robert B., "The Effect of the Similarity of Oral and Written Patterns of Language Structure on Reading Comprehension," Elem. Eng. 42:403-10, April 1965.

[28] MacKinnon, op. cit.

From a study of contextual associations in children from eight to thirteen years of age Werner and Kaplan concluded that the reader must understand the nature of the sentence "as a stable and articulate structure" if he is to understand the words presented.[29] Even though the child has control over varied patterns of language structure in his oral language, as shown by Strickland and Loban, this does not necessarily insure that he will experience success in dealing with these same patterns in reading material. As previously pointed out, a greater burden is placed on the beginning reader in that the graphic symbols carry little prosodic information, and an understanding of the relationship between words must be developed. Lefevre has suggested that the beginning reading program be designed to encompass a study of suprasegmental elements, word order, and syntax in facilitating understanding of the structure of the printed language and how it fits into the child's already well-developed spoken language structure.[30] Strickland has recommended that reading programs emphasizing elements of this nature and based on sound linguistic principles be constructed and tested in experimentally controlled settings.[31]

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[29] Werner, J., and E. Kaplan, The Acquisition of Word Meanings: A Developmental Study, 120 pp.

[30] Lefevre, Carl A., Linguistics and the Teaching of Reading, 252 pp.

[31] Strickland, Ruth G., The Contribution of Structural Linguistics to the Teaching of Reading, Writing, and Grammar in the Elementary School, 44 pp.

It is hypothesized that specific instruction designed to develop an understanding of the relationship between the child's familiar spoken system of communication and the written language system with which he is confronted would facilitate the acquisition of the reading process. The second hypothesis of the study thus states: Beginning reading materials placing special emphasis on specific aspects of language structure as related to meaning will result in significantly higher reading comprehension achievement than reading materials making little provision for such emphasis.

A major consideration in the two preceding hypotheses is provision for conditions leading to the maximum possible transfer from the written language symbols and patterns to their oral language and meaning counterparts. In this perspective, both hypotheses obtain support from general learning theory. Hovland states that the similarity between the original and the interpolated learning is one of the most significant factors affecting learning.[32] A similar observation is made by Osgood.[33] Thorpe and Schmuller point to the greater efficiency in learning when an opportunity is provided for the learner to perceive a "meaningful relationship among the elements of the goal toward which he is working."[34] Smith and Dechant note that learning transfer is facilitated "when the child recognizes that what he is learning fits into the framework of what he already knows."[35] Greater utilization of the language framework over which the child already possesses control would thus seem to be of importance to reading acquisition in the beginning program.

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[32] Hovland, Carl I., "Human Learning and Retention," in Handbook of Experimental Psychology, pp. 613-89.

[33] Osgood, Charles E., Method and Theory in Experimental Psychology.

[34] Thorpe, Louis P., and Allan M. Schmuller, Contemporary Theories of Learning, 480 pp.

This is not to say that beginning reading materials presently in widespread use do not provide for the development of sound-symbol correspondences and the use of syntactic patterning in reading experiences. It is quite evident that independent word attack and reading comprehension skills are established with a majority of children by using current basal readers. The major consideration of this study, however, deals with the possible value of beginning reading programs possessing more consistent grapheme-phoneme correspondences and specific emphasis on language structure as related to meaning for the improvement of reading achievement of first grade children.

Development of Third Hypothesis

Francis has theorized that the degree of development of the child's morphological and syntactical systems is directly related to his success in learning to read.[36] He has suggested that in the initial stage of reading acquisition a child relies heavily on his phonological and grammatical systems. The initial stage of reading as described by Francis' language model involves the association of the graphological and phonological systems followed by direct involvement of the grammatical system encompassing the morphological and syntactical systems, which enables the semantic aspect of word association and meaning to be utilized by the child. Findings from experimental research lend support to the latter statement. Miller has shown experimentally that an individual must assign a constituent structure to a sentence in order to understand it.[37] This implies that the process of obtaining meaning from the graphological system or printed form directly utilizes the morphological and syntactical systems and involves more than the referential associations of individual words. It is thus hypothesized that in the beginning stages of the reading process a child's reading comprehension achievement is a function of the control which he exhibits over specific aspects of his morphological and syntactical systems.

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[35] Smith and Dechant, op. cit.

[36] Francis, W. N.,"Language, Speech, and Writing" (mimeographed), 22 pp.

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[37] Miller, George A., "Some Psychological Studies of Grammar," Amer. Psychologist 17:748-62, November 1962.

CHAPTER III

METHODOLOGY AND RESEARCH DESIGN

The purpose of the study was to investigate the effect on reading achievement of four first grade reading programs varying in (a) the degree of regularity in grapheme-phoneme correspondences of the vocabulary presented, and (b) the emphasis on language structure as related to meaning. A secondary consideration dealt with a study of the relationship between children's morphological and syntactical language development and their reading achievement.

General Plan and Controls of the Study

The study encompassed the period of one school year from September 1964 to May 1965. Twenty-four first grade classrooms in the Oakland Unified School District, Oakland, California, were selected for the study to represent a wide range of socioeconomic levels. As indicated by the 1960 census report, eight of the classrooms were located in the lowest income areas of the school district, and eight in the highest income areas of the district. The remaining eight classrooms represented the middle income range. The teachers representing classrooms on each income level were randomly assigned to each of the four treatment groups (Programs B, P, B +, and P+).

Reading Program B, a basal reader,[1] was one of two basal programs available for use in the Oakland Unified School District. It was necessary to provide workbooks for this program. This basal reader series was selected for use in Program B and Program B+ because it had not been previously utilized by the teachers in the investigation. Reading program P[2] was provided by the research project for the study. In this manner it was insured that all reading programs were used for the first time by the teachers participating in the study.

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[1] Sheldon, William D., and others, Sheldon Basic Reading Series.

The supplementary aspects (+) of Programs B+ and P+, emphasizing language structure as related to meaning, were developed by the investigator. He accomplished this by drawing on his background and training in linguistics, psychology, and reading, and by utilizing materials and suggestions which were available in recently published texts,[3] research studies,[4] and curriculum center materials.[5]

A two and one-half day workshop was held at the beginning of the school year for the teachers in each treatment group.

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[2] Buchanan, Cynthia Dee, Programmed Reading.

[3] Borgh, Enola M., Grammatical Patterns and Composition, 44 pp.; Chomsky, Noam, Syntactic Structures, 118 pp.; Lefevre, Carl A., Linguistics and the Teaching of Reading, 252 pp.; Loban, Walter D., Margaret Ryan, and James R. Squire, Teaching Language and Literature, 748 pp.; Roberts, Paul, English Sentences, 294 pp.

[4] Loban, Walter D., The Language of Elementary School Children, 92 pp.; Strickland, Ruth G., The Contribution of Structural Linguistics to the Teaching of Reading, Writing, and Grammar in the Elementary School, 44 pp.; Strickland, Ruth G., The Language of Elementary School Children: Its Relationship to the Language of Reading Textbooks and the Quality of Reading of Selected Children, 131 pp.

[5] Univ. of Neb., Nebraska Curriculum Development Center, Curriculum for English.

At that time the basic instructional rationale, the methodology, and the instructions for the initial testing program were discussed in detail. Five teacher workshops were held for all treatment groups during the year. Provision for equal visitation and workshop time for all teachers in all treatment groups was carefully controlled throughout the investigation. The above considerations were believed essential in making provision for generating equivalent teacher interest in controlling for differences which might have been produced by the "Hawthorne effect."

The time devoted to the reading instruction period was held constant for each of the four treatment groups. The first group of subjects in Program B and in Program P devoted 60 minutes in the morning to reading; the second group of subjects in each program devoted 60 minutes in the afternoon to the same activity. Both programs thus used the split-group plan[6] common to the school district. The first group of subjects in Program B+ and Program P+ likewise utilized the split-group plan and devoted 45 minutes to basal reading in the morning while the second group devoted 45 minutes in the afternoon to the basal reading rpograms common respectively to Program B and Program P. The remaining 15 minutes in the morning and afternoon groups for subjects in Program B+ and Program P+ were utilized for the supplementary program emphasizing language structure as related to meaning.

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[6] Under the split-group reading plan the first group of pupils in the reading class arrives at 8:45 A.M., and reading is taught until 9:45 A.M. At 9:45 A.M. the second group of pupils joins the class. At 2:00 P.M. the pupils who came to school at 8:45 A.M. leave the class, and the pupils who entered school at 9:45 A.M. have reading class from 2:00 P.M. until 3:00 P.M.

During the first month of the 1964 school year the following tests were administered to all subjects: Metropolitan Readiness Test, Form A; Murphy-Durrell Diagnostic Reading Readiness Test; Thurstone Pattern Copying and Identical Forms Test; and the Pintner-Cunningham Primary Test of General Ability, Form A. Modified forms of Berko's Test of Morphology[7] and Fraser, Bellugi, and Brown's Test of Syntax[8] were administered individually to 160 randomly selected children (40 subjects from each treatment group). The latter two tests were used in measuring the subjects' control over specific aspects of their morphological and syntactical language systems.

In May of 1965 a battery of criterion tests was administered to evaluate reading achievement relative to the hypotheses of the study. These included the following: The Word Reading, Word Study Skills, Paragraph Meaning, and Vocabulary subtests of the Stanford Achievement Test; the Primary Test of Syntax designed by the investigator to measure sentence meaning; the Phonetically Regular Words Oral Reading Test designed by the University of Minnesota Coordinating Research Center to measure children's ability to decode words containing consistent correspondences; and the Gates Word Pronunciation Test administered to measure children's ability to decode words containing inconsistent correspondences. The last two tests were administered individually to the randomly selected group of children drawn from each treatment group. Other criterion measures were administered for the purpose of data collection for the Coordinating Center at the University of Minnesota.[9] These data did not relate to the hyoptheses of this study, however; a list of the tests administered and the data collected may be found in Appendices D and E respectively of this study.

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[7] Berko, Jean, "The Child's Learning of English Morphology," Word 14:150-77, 1958.

[8] Fraser, Colin, Ursula Bellugi, and Roger Brown, "Control of Grammar in Imitation, Comprehension, and Production," J. of Verbal Learning and Verbal Behavior 2:121-35, August 1963.

Instructional Materials Encompassed in Treatments

The following description includes the published and unpublished materials evaluated in the study.

1. Program B--A basal reader program--the Allyn Bacon Reading Series.[10]
    a. Grapheme-phoneme regularities were not controlled in vocabulary presented.
    b. Emphasis on phonic training in establishing grapheme-phoneme correspondences was initiated at primer level.

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[9] The Coordinating Center at the University of Minnesota, Minneapolis, under the direction of Dr. Guy Bond and Dr. Robert Dykstra, served as the liaison between the 27 First Grade Research Projects for the purpose of coordinating the collection and treatment of common data.

[10] Sheldon, op. cit.

   c. Initial stages of phonic training dealt with initial consonant graphemes and phonemic correspondences.
   d. No specific emphasis on language structure as related to meaning was provided.

2. Program P--A basal reading program--the McGraw-Hill Programmed Reading Series.[11]
   a. Grapheme-phoneme regularities were controlled and programmed in the reading material presented.
   b. Emphasis on phonic training in establishing grapheme-phoneme correspondences was initiated in the prereading materials.
   c. Initial stages of phonic training dealt with the short a, the schwa, and four initial consonant sounds.
   d. No specific emphasis on language structure as related to meaning was provided.
   e. Program encompassed teacher manual and basal reader materials in programmed form.

3. Program B+--Language structure as related to meaning which supplemented Program B.
   a. All elements in Program B, excepting the lack of emphasis on language structure as related to meaning, were common to this program.
   b. The vocabulary introduced and developed in Program B was used in the materials and exercises in the supplementary aspects of this program. It was considered

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[11] Buchanan, op. cit.

essential that the children be familiar with the vocabulary in order that emphasis may be focused on the way words and groups of words function together in conveying meaning.

c. The various topics were introduced and developed inductively through class discussion and participation which was motivated and guided by the teacher. From the discussion and participation, examples illustrating specific concepts were developed, and pupils individually or in small groups attempted to construct similar examples to convey the intended meaning of a concept.

d. Materials available for the children's use consisted of individual word cards and one and one-half inch cubes depicting words with which the children had become familiar. The words on the cards and blocks were grouped on the basis of form class. These materials provided for ease and flexibility in constructing examples of language patterns and various expansions of these patterns in conveying the intended meanings of a concept. Special mimeographed materials were prepared to encompass the concepts presented below using the familiar vocabulary from Program B. The reading materials from Program B were also utilized by locating and emphasizing specific structural concepts

e. Emphasis on oral and written language structure as related to meaning characterized the concepts developed in this program. Detailed teacher plans were developed for each lesson. The following topics were included:

(1) Intonation as related to change of meaning in oral language; e.g., "The boy hit the ball."

"The boy hit the ball!"

"The boy hit the ball?"

How is the meaning changed in relation to intonation?

(2) Intonation as related to change of meaning in written language and how this is related to oral language; e.g., The boy hit the ball. (period)

The boy hit the ball! (exclamation)

The boy hit the ball? (question)

How is the meaning changed in relation to punctuation?

(3) Word order and the importance of word order to meaning; e.g., The man hit the ball.

The ball hit the man.

How is the meaning changed in relation to word order?

(4) Word order and the use of common stable elements as related to meaning. Emphasis was placed on characteristics common to words which can occur in the same positions and how these words affect meaning; e.g., The man hit the ball.

boy kicked hat

girl threw rock

How is the meaning changed? What is similar about the use of these words (e.g., man, boy, girl)?

(5) Word order and the use of expanded descriptive elements as related to meaning; e.g.,

The man kicked the ball.

The man kicked the big ball.

The big man kicked the ball.

How is the meaning changed? What else do we know about the ball and the man in the second and third sentences?

(6) Expansion of various types of basic sentence structures through the use of movables as related to meaning.

(a) Subject - predicate

The boy ran.

The boy ran fast.

The boy ran fast after the dog.

Yesterday the boy ran fast after the dog.

How is the meaning changed? Why?

(b) Subject - predicate - object

The man drove the car.

The man drove the car very fast.

The man drove the car very fast yesterday.

How is the meaning changed? Why?

(c) Subject - linking predicate - predicate nominative.

Tom is a good boy.

Tom is a good boy most of the time.

How is the meaning changed? Why?

(d) Subject - linking predicate - predicate adjective

Tom is good.

At school Tom is good.

How is the meaning changed? Why?

Other basic concepts were developed from the following sources:

Borgh, Enola M. Grammatical Patterns and Composition, Wilconsin Council of Teachers of English, Oshkosh, Wisconsin, 1963.

Chomsky, Noam. Syntactic Structures, 's-Gravenhage: Mouton & Co., 1962.

Curriculum for English, Nebraska Curriculum Development Center, The University of Nebraska, Lincoln, Nebraska, 1963.

Lefevre, Carl A. Linguistics and the Teaching of Reading, New York: McGraw-Hill Book Co., 1964.

Loban, Walter D., et al. Teaching Language and Literature, New York: Harcourt, Brace & World, Inc., 1961.

National Council of Teachers of English. English for Today (Books One through Six), New York: McGraw-Hill Book Co., 1962.

Newsome, Vera L. Structural Grammar in the Classroom, Wisconsin Council of Teachers of English, Oshkosh, Wisconsin, 1961.

Roberts, Paul. English Sentences, New York: Harcourt, Brace & World, Inc. 1962.

Strickland, Ruth G. The Contribution of Structural Linguistics to the Teaching of Reading, Writing, and Grammar in the Elementary School, Bulletin of the School of Education, Indiana University, Vol. 40, No. 1, Bloomington, January, 1964.

Strickland, Ruth G. The Language of Elementary School Children: Its Relationship to the Language of Reading Textbooks and the Quality of Reading of Selected Children, Bulletin of the School of Education, Indiana University, Vol. 38, No. 4, Bloomington, July, 1962.

4. Program P+--Language structure as related to meaning which supplemented Program P.
    a. All elements in Program P, excepting the lack of emphasis on language structure as related to meaning, were common to this program.
    b. The vocabulary introduced and developed in Program P was used in the materials and exercises in the supplementary aspects of this program. It was considered essential that the children be familiar with the vocabulary in order that emphasis could be focused on the way words function together in conveying meaning.
    c. The concepts, exercises, and materials were developed, presented, and utilized in a fashion identical with that in B+. The vocabulary utilized in building the exercises and materials, however, consisted of the words found in Program P.

Differentiation of Instruction

All programs involved grouping of a similar nature. Program B, the Allyn-Bacon reading series,[12] relied on basic reading texts and workbooks which were utilized in ability grouping settings. This grouping was developed around vocabulary presentations, oral reading, and comprehension discussions. A minimum number of four groups were involved in each class, and individual and small group follow-up exercises were developed through the workbook and teacher activity exercises.

In Program P, the McGraw-Hill programmed materials,[13] ability grouping settings as well as individual and small group activities were utilized. The latter activities were well provided for by the nature of the programmed materials with self-checking information directly available to the pupil. A minimum number of four groups were involved in vocabulary development, oral reading, and comprehension discussions.

Program B+, the Allyn-Bacon reading series supplemented by emphasis on language structure as related to meaning, was developed in a fashion identical with the method used in Program B. The special emphasis on language structure was developed through teacher-directed group discussions and through exercises designed so that the pupils could participate individually and in small groups.

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[12] Sheldon, op. cit.

[13] Buchanan, op. cit.

Program P+, the McGraw-Hill materials supplemented by the emphasis on language structure as related to meaning, was developed by the identical method used in Program P. The special emphasis on language structure was also developed through teacher-directed group discussions and through exercises designed for pupil participation both individually and in small groups.

It should be emphasized that the split-group reading plan used in the school district (previously described under "General Plan and Controls of the Study") greatly facilitated grouping and individualization of instruction. By reducing the size of each reading class by approximately one-half, much more time could be devoted to the instructional activities in small group settings.

Enrichment of Instruction

An attempt was made to provide similar enrichment emphasis in each of the four reading programs. This was accomplished by preschool and in-service teacher workshop discussions related to supplementary reading and language arts activities. A record was kept by the teachers of the children's voluntary reading to provide some insight into the type and quantity of materials read. The classroom visits and observations made by the investigator throughout the year were valuable in developing consistency in the use of reading and other language arts enrichment activities in each of the programs.

Supervisory and Teacher Education Activities

A series of teacher education activities was developed in the study. Preschool and in-service teacher education workshops were held, and all teachers participating in the study were involved. Two weeks before the opening of school a two and one-half day workshop was conducted. Discussions with all teachers centered about the purposes, objectives, and materials of the study. Teachers who had been randomly assigned to each of the four programs received special instruction on the rationale and methodology of their particular reading program. The materials to be used in each of the programs were discussed and examined in depth by each group of teachers directing the program. Provisions for individual and group activities for children on various ability levels received special emphasis.

The investigator was directly involved in supervisory activities. During the first month he visited each of the twenty-four classrooms at least once. Throughout the year five in-service meetings were held to discuss instructional aspects of the programs.

Measures and Observations[14]

The following measures and observations were made in obtaining data for the dependent and independent variables of the study.

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[14] A more complete description of each variable may be found in Chapter I, "Definition of Terms."

1. Word Reading--Stanford Achievement Test, Primary I.
2. Word Study Skills--Stanford Achievement Test, Primary I.
3. Regular Word Identification--Phonetically Regular Words Oral Reading Test (designed by a committee working with the Coordinating Center at the University of Minnesota).
4. Irregular Word Identification--Gates Word Pronunciation Test.
5. Paragraph Meaning Comprehension--Stanford Achievement Test, Primary I.
6. Vocabulary Meaning--Stanford Achievement Test, Primary I.
7. Sentence Meaning Comprehension--Primary Test of Syntax (designed by the investigator).
8. Morphological Language Development--Berko's Test of Morphology.
9. Syntactical Language Development--Fraser, Bellugi, and Brown's Test of Syntax.
10. Mental Age--Pintner-Cunningham Primary Test of General Ability, Form A.
11. Socioeconomic Status--Minnesota Scale for Paternal Occupations.
12. Chronological Age--School records.
13. Sex--School records.
14. Reading Readiness--Metropolitan Readiness Test, Murphy-Durrell Diagnostic Reading Readiness Test, and the Thurstone Pattern Copying and Identical Forms Test.

Analysis of Data

Each experimental hypothesis was stated in terms of its null form for testing. For the first two hypotheses of the study the analysis of covariance was completed first and the t test was used in testing individual contrasts. The covariate for each criterion variable consisted of the readiness variable which was found to correlate most highly with the dependent variable under consideration. The F test was employed in testing for significant treatment effects. If no significant treatment effects were found, then no attempt was made to compare individual treatment groups except in cases where the observed F value closely approached the critical region. If significant effects were found on the F test, then individual comparisons of the means were made using the t test.

The Pearson Product Moment Correlation was used in testing the third hypothesis of the study. The four exploratory questions of the study were investigated by using the Scheffé method of contrasts in a post-hoc analysis.

One hundred and twenty cases were excluded from the total sample of 673 subjects at the beginning of the data analysis. These were cases who had scores on two or less of the 18 dependent variables collected for purposes of this study and for the University of Minnesota Coordinating Center. The resulting group consisted of a base of 553 subjects. This sample was used in computing the main treatment effects on each of the 18 dependent variables. This sample base ranged in size from 553 to 530 depending on the number of missing scores for the dependent variable under consideration. The main treatment effects were analyzed using BMDO4V, an analysis of covariance program available from the Computer Center at the University of California, Berkeley.

In addition, two groups of subjects were later excluded to meet the requirements of the particular analysis of covariance computer program which was available (WLSQ). These two groups of excluded subjects were: first, those subjects who were missing scores on at least two variables out of the set of vocabulary, arithmetic, total number of words spelled, total number of running words, average sentence length, average communication unit, primary syntax test I, and primary syntax test II; and second, those subjects who were missing scores on at least two variables out of the set of the San Diego Attitude Inventory, word reading, paragraph meaning, word study skills, spelling and the mechanical ratio scale. The first and second groups of subjects contained 425 and 411 cases respectively. These subjects constituted the samples used in assessing the treatment effects on the dependent variables at the various levels of socioeconomic status, sex, chronological age, and mental age. There are occasionally small differences between the mean values of the dependent variables based on these two smaller samples and those based on the large sample of 553 cases. These differences, however, are not significant and are accounted for by the chance fluctuation of the mean when it is based on a sample smaller than the available total population.

The computer program used with the two smaller sets of subjects was one of a series available through the Survey Research Center at the University of California, Berkeley. This program, known as the WLSQ Program, is a general purpose program providing an analysis of multiple cross-classifications. The program permitted missing data and unequal subject numbers in the cells of the analysis of covariance tables. In addition to computing the variance values for tests of significance, the program also provided values for each cell from which adjusted means were computed; i.e., the cell means of the dependent variables were corrected for the effect of the particular covariate selected in the analysis. The differences between these adjusted means were tested for significance using the methods previously described.

CHAPTER IV

FINDINGS OF THE STUDY

The primary objective of this investigation was to study the effect on word recognition skills and reading comprehension of four reading programs which varied in (a) the degree of regularity of grapheme-phoneme correspondences programmed into the vocabulary presented, and (b) the emphasis on language structure as related to meaning. The first two hypotheses were designed to explore this primary objective.

The secondary objective was to examine the relationship between reading comprehension achievement and morphological and syntactical language development of first grade children. This objective was examined in the third hypothesis of the study. A study of the relationship between each of the independent variables, consisting of mental age, socioeconomic status, sex, and chronological age, and each of the dependent variables encompassed in the measures of word recognition skills and reading comprehension skills was effected by use of four exploratory questions.

The First Hypothesis of the Study--Part One

The first part of the initial hypothesis of the study stated that the first grade reading programs possessing a high degree of consistency in grapheme-phoneme correspondences in the vocabulary introduced (Program P and Program P+) will result in significantly higher (a) word reading, (b) word study skills, and (c) regular word identification achievement scores than the reading programs making little provision for consistent correspondences (Program B and Program B+). The adjusted means for the dependent variables are presented in Table 1.

TABLE 1

ADJUSTED MEANS AND t VALUES FOR WORD READING, WORD STUDY SKILLS, AND REGULAR WORD IDENTIFICATION SCORES, FOR TREATMENT GROUPS B, P, B+, AND P+

Dependent Variables	Group B	Group P	t value	Group B+	Group P+	t value	Covariate
W.R.	17.60 (N=132)	20.67* (N=134)	4.86	16.51 (N=157)	19.70* (N=124)	5.06	Murphy-Durrell Diagnostic Reading Readiness Test
W.S.S.	32.48 (N=133)	33.42 (N=134)	.95	30.93 (N=155)	34.98* (N=123)	4.05	Murphy-Durrell Diagnostic Reading Readiness Test
R.W.I.	5.44 (N=44)	9.09* (N=41)	3.16	3.08 (N=42)	10.02* (N = 40)	5.73	Metropolitan Readiness Test

*Significant at the .05 level.

Word Reading. In relation to the word reading scores, part one (a) of the first hypothesis, the means were found to be significantly different in favor of the programs using the consistent correspondences. These data are shown graphically in Figure 1. On the basis of these data the null form of the hypothesis was rejected and the experimental hypothesis was thus accepted.

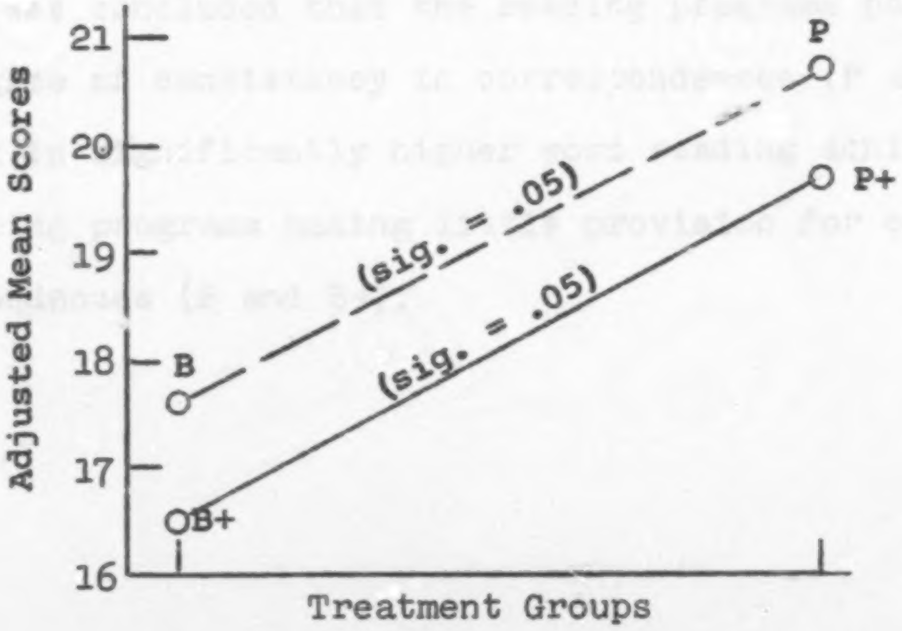

Fig. 1--Adjusted Means for the Word Reading Scores for Treatment Groups B, P, B+, and P+.

It is interesting to observe in Figure 1 that the mean values for Program B and Program P are consistently higher than for Program B+ and Program P+. Although these differences were not significant and were unrelated to the hypothesis, a possible explanation of the consistent trend may be found in the extra time taken for the development of the supplementary aspect (+) of the B+ and P+ programs. The pupils in Programs B+ and P+ spent approximately 15 minutes per day on the supplementary program while the pupils in Programs B and P continued to progress through the basal materials. Thus it might be expected that the performance of subjects in the B and P programs might exceed the performance of subjects in the B+ and P+ programs on the task of recognizing words in relation to picture stimuli.

It was concluded that the reading programs possessing a high degree of consistency in correspondences (P and P+) resulted in significantly higher word reading achievement than the reading programs making little provision for consistent correspondences (B and B+).

Word Study Skills. The means for the word study skills scores, relative to part one (b) of the first hypothesis, were found to differ significantly between Program B+ and Program P+ as predicted. No significant difference was found between Program B and Program P. These data are illustrated in Figure 2. On the basis of these data the null form of the hypothesis relative to Program B+ and Program P+ was rejected and the experimental hypothesis was accepted. Although the mean difference between Program B and Program P was in the predicted direction, it was not of sufficient magnitude to reach significance, and the null form of the hypothesis could not be rejected.

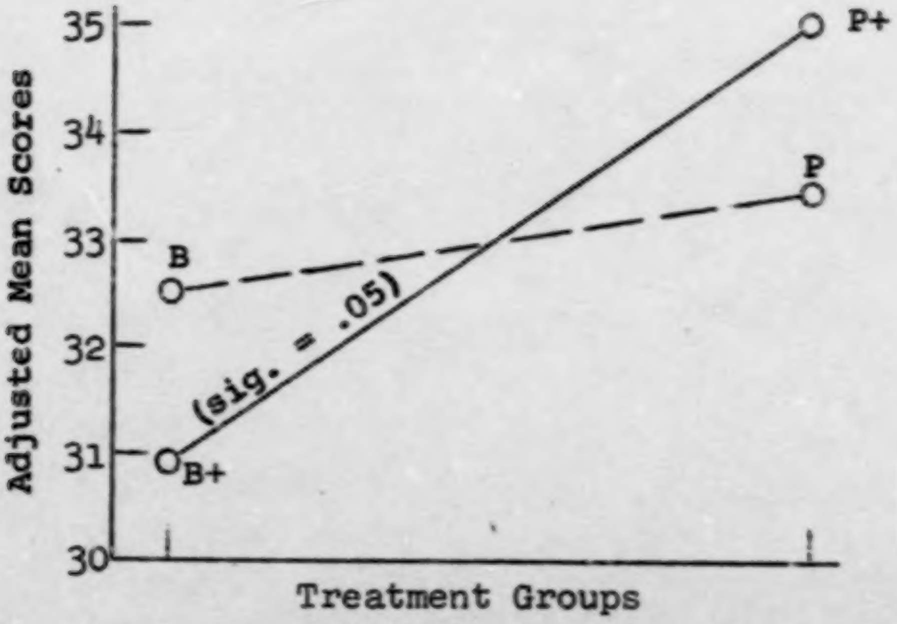

Fig. 2--Adjusted Means for the Word Study Skills Scores for Treatment Groups B, P, B+, and P+.

Again it is interesting to observe that the pattern of mean differences similar to that indicated in Figure 1 was found to occur. The difference between Program B and Program B+ may be explained by the 15 minute-per-day time differential favoring Program B. A reverse pattern, however, is evident between the P and P+ programs. It was expected that the mean value for pupils in Program P would slightly exceed the mean value for pupils in Program P+. As is evident in Figure 2, the reverse of this expectation occurred. The data presented in Table 2 offer an additional clue to this reverse pattern.

TABLE 2

ANALYSIS OF COVARIANCE OF WORD STUDY SKILLS SCORES FOR TREATMENT GROUPS B, P, B+, AND P+

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Basal Programs (B,P)	1	737	737	8.57**
Supplementary Programs (B+,P+)	1	7	7	.08
B.P. X S.P.	1	379	379	4.41*
Error (within)	540	46,440	86	

*Significant at the .05 level.
** " " " .01 "

A significant interaction is noted between the basal programs (B,P) and the supplementary programs (B+,P+). This evidence, combined with an inspection of Figure 2, suggests that the supplementary program (+) interacted in some manner with the

P program to produce higher achievement on the word study skills task in the P+ program. As previously mentioned, a significant difference was found between the P+ program and the B+ program. The magnitude of the difference illustrated in Figure 2 also suggests that the supplement (+) for the B program did not interact in the same way as the supplement (+) for the P program.

It is possible that the suggested interaction between the language structure supplement (+) and the P program may have been produced by the vocabulary used in the P+ supplementary program. This vocabulary was drawn from words used in the P program. As a result, it contained highly regular correspondences, which may have reinforced the development of the pupils' performance on the word study skills task. The language structure supplement (+) designed to accompany the B program used vocabulary drawn from the B program. The vocabulary in Program B, however, did not contain regular correspondences. The interaction suggested in Figure 2 between the supplementary program (+) and Program P should be pursued in future research.

It was concluded that the reading program possessing a high degree of consistency in correspondences and placing special emphasis on language structure (P+) resulted in significantly higher word study skills achievement than the reading program making little provision for consistent correspondences and placing emphasis on language structure (B+). No significant difference was found between word study skills means for the reading program possessing a high degree of consistency in correspondences (P) and the program making little provision for consistent correspondences (B).

Regular Word Identification. The mean values for the regular word identification scores, in relation to part one (c) of the first hypothesis, were found to differ significantly favoring the programs utilizing consistent correspondences. These data are presented in Figure 3. Based on these data, the null form of the hypothesis was rejected and the experimental hypothesis was accepted. The pattern of mean differences illustrated in Figure 3 for the regular word identification mean scores appears to be similar to that found in Figure 2 for the word study skills mean values.

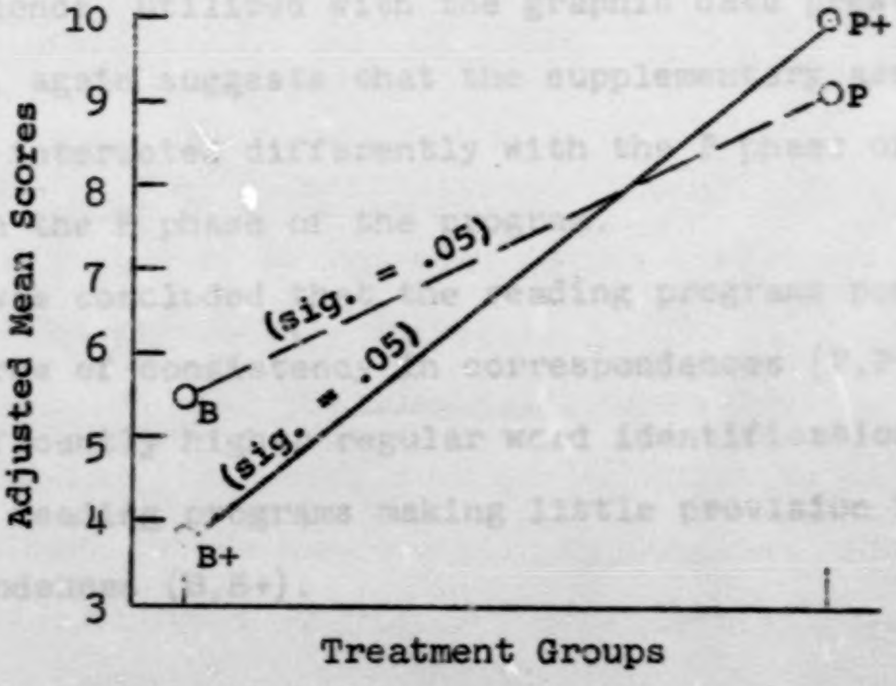

Fig. 3--Adjusted Means for the Regular Word Identification Scores for Treatment Groups B, P, B+, and P+.

A significant interaction between the basal reading programs (B,P) and the supplementary reading programs (B+, P+) for the regular word identification scores is evident in Table 3.

TABLE 3

ANALYSIS OF COVARIANCE OF REGULAR WORD IDENTIFICATION SCORES FOR TREATMENT GROUPS B, P, B+, AND P+

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Basal Programs (B,P)	1	1,151	1,151	37.13**
Supplementary Programs (B+,P+)	1	23	23	.74
B.P. X S.P.	1	125	125	4.03*
Error (within)	162	5,022	31	

*Significant at the .05 level.
** " " " .01 "

This evidence, utilized with the graphic data presented in Figure 3, again suggests that the supplementary aspect of the programs interacted differently with the P phase of the program than with the B phase of the program.

It was concluded that the reading programs possessing a high degree of consistency in correspondences (P,P+) resulted in significantly higher regular word identification achievement than the reading programs making little provision for consistent correspondences (B,B+).

The First Hypothesis of the Study--Part Two

The second part of the initial hypothesis of the study stated that the first grade reading programs making little provision for consistent correspondences (Programs B and B+) will result in significantly higher irregular word identification achievement scores than the reading programs possessing a high degree of consistency in grapheme-phoneme correspondences in the vocabulary presented (Programs P and P+). The adjusted means for the dependent variables are presented in Table 4.

TABLE 4

ADJUSTED MEANS AND t VALUES FOR IRREGULAR WORD IDENTIFICATION SCORES FOR TREATMENT GROUPS B, P, B+, AND P+

	Group B	Group P	t value	Group B+	Group P+	t value	Covariate
I.W.I.	10.80 (N=44)	11.83 (N=41)	.85	9.93 (N=39)	12.79* (N=39)	2.25	Metropolitan Readiness Test

*Contrast significant at the .05 level.

Irregular Word Identification. The null form of the hypothesis could not be rejected on any contrast. These data are presented graphically in Figure 4.

It is noted that the mean differences for the irregular word identification scores were in the opposite direction from that predicted by the experimental hypothesis. Program B+ and Program P+ were found to differ significantly; however, the mean difference between Program B and Program P was not significant. These differences suggest that the subjects in the treatment groups utilizing a high degree of consistency in correspondences were able to deal as effectively, and in one case significantly more effectively, with inconsistent correspondences than the subjects in treatment groups utilizing a high degree of inconsistency in the correspondences. Although the means graphically illustrated in Figure 4 follow the same pattern as the word study skills and regular word identification means, no significant interaction was found in the analysis.

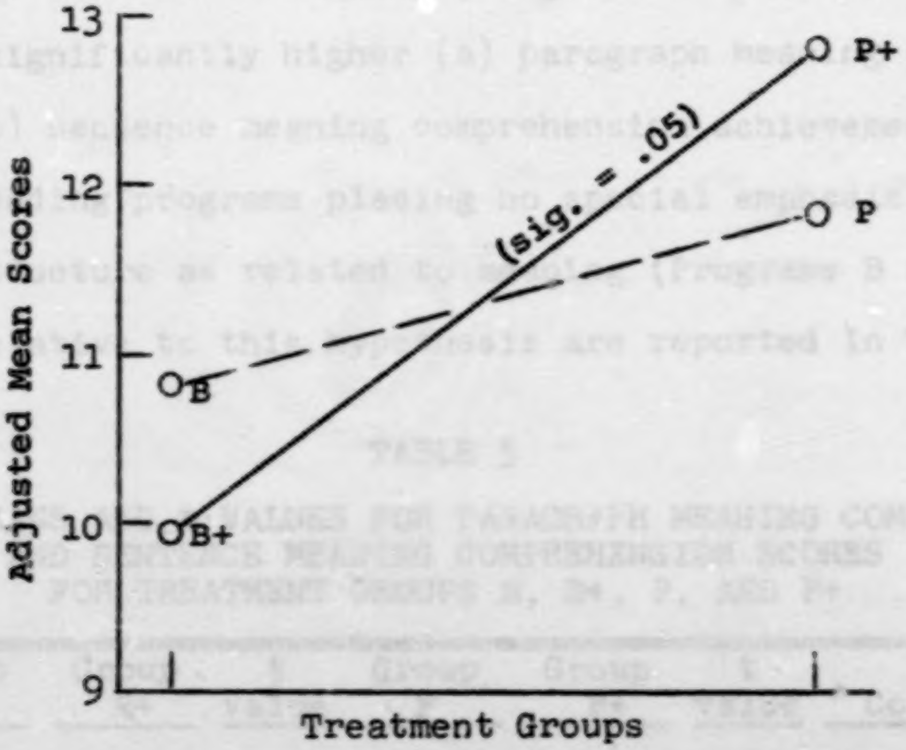

Fig. 4--Adjusted Means for the Irregular Word Identification Scores for Treatment Groups B, P, B+, and P+.

It was concluded that the program providing for consistency in correspondences and placing emphasis on language structure (P+) resulted in significantly higher irregular word identification scores than the reading program making little provision for consistency and placing emphasis on language structure (B+). The program making little provision for consistent correspondences (B) did not result in significantly higher irregular word identification achievement scores than the program placing emphasis on consistent correspondences (P).

The Second Hypothesis of the Study

The second hypothesis of the study stated that the first grade reading programs placing special emphasis on language structure as related to meaning (Programs B+ and P+) will result in significantly higher (a) paragraph meaning comprehension and (b) sentence meaning comprehension achievement scores than the reading programs placing no special emphasis on language structure as related to meaning (Programs B and P). The data relative to this hypothesis are reported in Table 5.

TABLE 5

ADJUSTED MEANS AND t VALUES FOR PARAGRAPH MEANING COMPREHENSION AND SENTENCE MEANING COMPREHENSION SCORES FOR TREATMENT GROUPS B, B+, P, AND P+

	Group B	Group B+	t value	Group P	Group P+	t value	Covariate
P.M.	17.25* (N=132)	13.78 (N=156)	3.99	15.66 (N=134)	17.56* (N=123)	2.04	Murphy-Durrell Diagnostic Reading Readiness Test
S.M.	22.24 (N=130)	23.10 (N=155)	.59	23.96 (N=132)	29.42* (N=116)	3.45	Metropolitan Readiness Test

*Contrast significant at the .05 level.

Paragraph Meaning. In relation to part (a) of the second hypothesis, significant differences were found between the means on paragraph meaning comprehension. As illustrated in Figure 5, however, these differences were not consistently in the predicted direction.

The mean difference between Program P and Program P+ was significant, favoring the P+ program. The null form of the hypothesis, expressing no difference between Group P and Group P+, was thus rejected and the experimental hypothesis was accepted. The mean difference, however, between Program B and Program B+ favored Program B, a finding which was contrary to the experimental hypothesis. Therefore, this experimental hypothesis could not be accepted, although the null form of this part of the hypothesis was rejected.

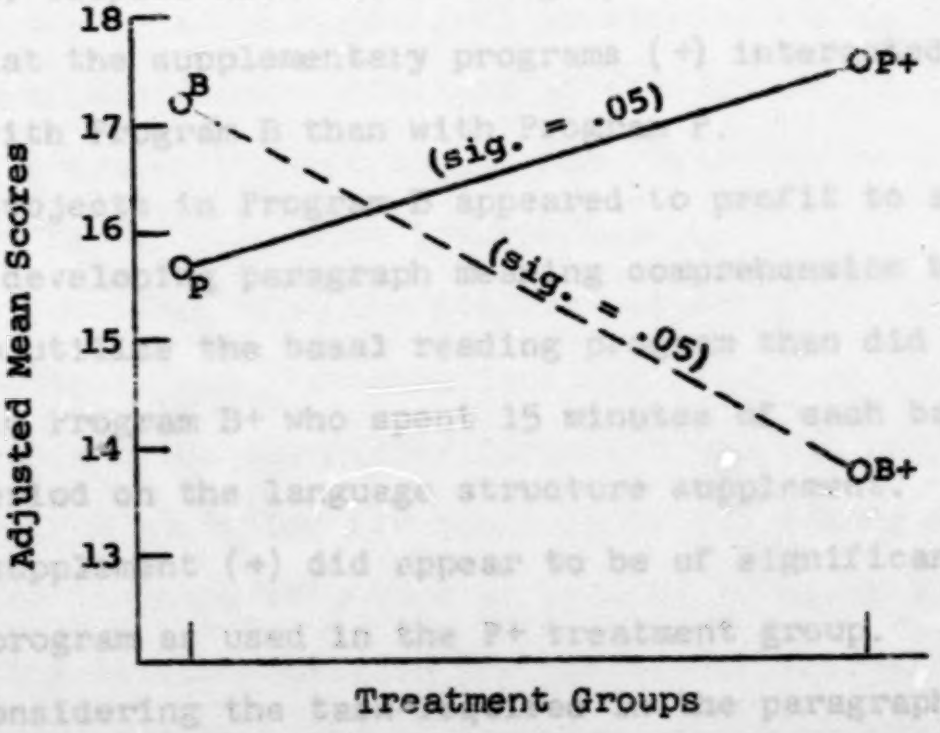

Fig. 5--Adjusted Means for the Paragraph Meaning Comprehension Scores for Treatment Groups B, B+, P, and P+.

The data presented in Table 6 show an interaction between the basal programs (B,P) and the supplementary programs (B+,P+).

TABLE 6

ANALYSIS OF COVARIANCE OF PARAGRAPH MEANING COMPREHENSION SCORES FOR TREATMENT GROUPS B, B+, P, AND P+

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Basal Programs (B,P)	1	195	195	3.05
Supplementary Programs (B+,P+)	1	136	136	2.12
B.P. X S.P.	1	956	956	14.94*
Error (within)	540	34,560	64	

*Significant at the .01 level.

These data, coupled with the findings presented in Figure 5, suggest that the supplementary programs (+) interacted differently with Program B than with Program P.

The subjects in Program B appeared to profit to a greater extent in developing paragraph meaning comprehension by continuing to utilize the basal reading program than did the subjects in Program B+ who spent 15 minutes of each basal reading period on the language structure supplement. The language supplement (+) did appear to be of significant value to the P program as used in the P+ treatment group.

In considering the task required in the paragraph meaning comprehension test, however, the difference in mean values for the B and the B+ treatments is not of a surprising nature. The language structure supplement (+) placed major emphasis on meaning contrasts within sentences rather than between sentences. Thus, one would not expect the language structure supplement as designed for the first year of the study to greatly enhance paragraph meaning comprehension. The value of the supplement to Program P+, however, is evident in the significant difference favoring the P+ program when contrasted with Program P. This may be interpreted to mean that the supplement was of value to the P+ program in developing an understanding of meaning conveyed in sentences, which in turn was of value to performance on the paragraph meaning comprehension task. It is evident in Figure 5 that Program B was as effective in developing paragraph meaning comprehension as Program P+. The language structure supplement in the second year of the study has been designed to stress meaning derived from groups of sentences. Findings at the end of the second year of the research project should provide evidence which will reinforce or reject the above interpretation.

It was concluded that the program providing for consistency in correspondences and stressing language structure (P+) resulted in significantly higher paragraph meaning comprehension than the program providing for consistency and making no special provision for language structure as related to meaning (P). The program making little provision for consistent correspondences and placing special emphasis on language structure (B+) did not result in significantly higher paragraph meaning comprehension scores than the program making little provision for consistent correspondences and placing no special emphasis on language structure as related to meaning (Program B). In the latter case, however, significant differences were found favoring the direction of Program B.

Sentence Meaning. In testing part (b) of the second hypothesis, related to sentence meaning comprehension,* a significant difference was found between Program P+ and Program P favoring the P+ program. No significant difference was found between the means for Program B and Program B+. These data are illustrated in Figure 6.

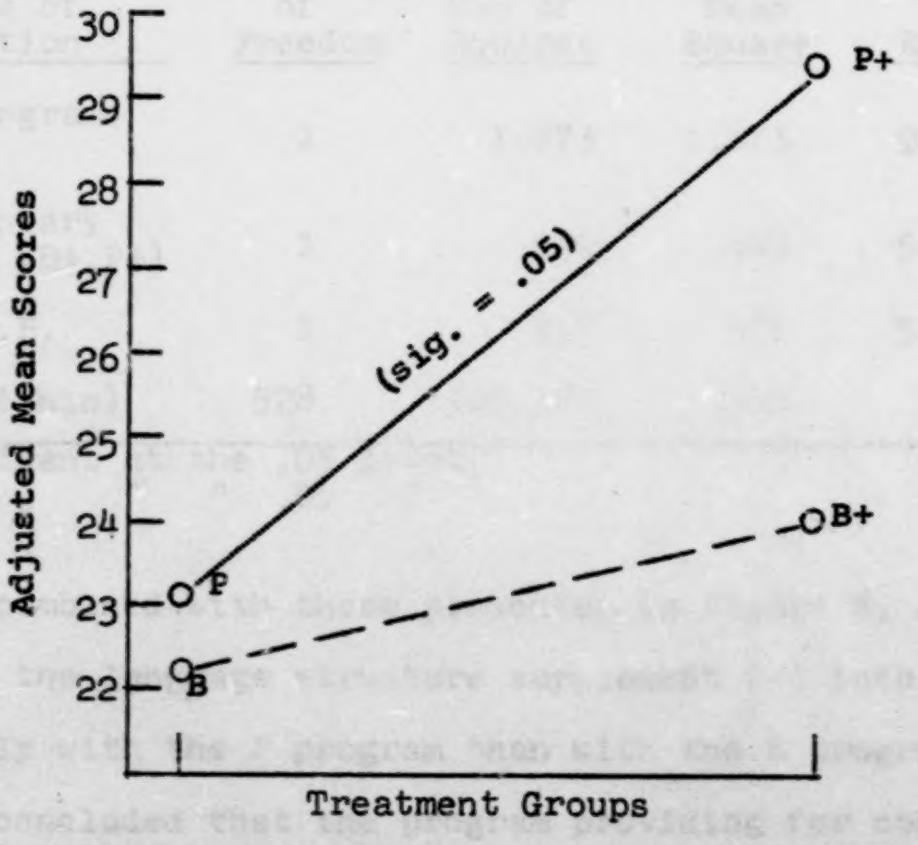

Fig. 6--Adjusted Means for the Sentence Meaning Comprehension Scores for Treatment Groups B, B+, P, and P+.

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*See later discussion under "Third Hypothesis of the Study" for reliability information on the Primary Test of Syntax used in measuring the sentence meaning comprehension variable.

The significant difference between Program P+ and Program P led to the rejection of the null hypothesis and the acceptance of the experimental hypothesis. Although the difference between Program B+ and Program B was in the direction predicted by the hypothesis, it was not of sufficient magnitude to reach significance. Thus, in the latter case the null form of the hypothesis could not be rejected.

The data presented in Table 7 reveal an interaction between the basal programs (B,P) and the supplementary programs (B+,P+).

TABLE 7

ANALYSIS OF COVARIANCE OF SENTENCE MEANING COMPREHENSION SCORES FOR TREATMENT GROUPS B, B+, P, AND P+

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Basal Programs (B,P)	1	1,873	1,873	9.86**
Supplementary Programs (B+,P+)	1	969	969	5.10*
B.P. X S.P.	1	977	977	5.14*
Error (within)	528	100,320	190	

*Significant at the .05 level.
** " " " .01 "

These data, combined with those presented in Figure 6, again suggest that the language structure supplement (+) interacted more favorably with the P program than with the B program.

It was concluded that the program providing for consistency in correspondences and stressing language structure (P+) resulted in significantly higher sentence meaning comprehension achievement than the program providing for consistency and making no special provision for language structure as related to meaning (P). The program making little provision for consistent correspondences and placing emphasis on language structure as related to meaning (B+) did not result in significantly higher sentence meaning comprehension scores than the program making little provision for consistent correspondences and placing no special emphasis on language structure as related to meaning (B).

The data presented in Figures 5 and 6 respectively suggest that on the paragraph and sentence meaning comprehension variables the language structure supplement (+) interacted differently with the P program in the P+ treatment group than with the B program in the B+ treatment group. In both cases the interaction favored the P+ program. This may have been produced by the consistent correspondences used in the vocabulary of the language structure supplement of the P+ program. As previously discussed, the vocabulary of the supplement used in the B+ program contained inconsistent correspondences characteristic of the vocabulary used in Program B. It is possible that the additional reinforcement of consistent correspondences enabled the subjects in the P+ program to decode more effectively, as is suggested in Figures 2, 3, and 4. Should this have been the case, the subjects could then have mobilized the comprehension skills developed to perform significantly better on the paragraph and sentence meaning comprehension tasks. Careful observation will be given to these suggested interactions and trends in the second year of the study.

The Third Hypothesis of the Study

The third hypothesis of the study stated that paragraph meaning comprehension, sentence meaning comprehension, and vocabulary achievement of first grade subjects at the end of grade one are a function of the control which the subjects exhibit over designated aspects of (a) their morphological language system and (b) their syntactical language system at the beginning of grade one.

The morphology and syntax instruments were lengthened to provide equivalent forms of each test in order that the reliabilities of the instruments might be determined. Reliability coefficients for the test of morphology and the test of syntax, when corrected by the Spearman-Brown Prophecy Formula, were found to be respectively .95 and .93. The sentence meaning comprehension variable as measured by the Primary Test of Syntax, designed by the investigator, was found to have a corrected reliability of .93.

The correlations calculated to test each phase of the third hypothesis are presented in the correlation matrix in Table 8.

TABLE 8

CORRELATION COEFFICIENTS BETWEEN MORPHOLOGICAL AND SYNTACTICAL LANGUAGE DEVELOPMENT AT THE BEGINNING OF GRADE ONE AND SELECTED LANGUAGE VARIABLES AT THE END OF GRADE ONE

	M	S	PM	SM
Morphology				
Syntax	.74*			
Paragraph Meaning	.41*	.56*		
Sentence Meaning	.39**	.56*	.85*	
Vocabulary	.32**	.53*	.72*	.71*

*Significant at the .01 level.
** " " " .05 " (N = 41)

The correlation coefficients between the morphology test scores and the achievement scores of paragraph meaning, sentence meaning, and vocabulary were found respectively to be .41, .39, and .32. The coefficients between the syntax test scores and paragraph meaning, sentence meaning, and vocabulary scores were found to be respectively .56, .56, and .53. These findings reveal that the child's control over the designated aspects of his morphological and syntactical language system is significantly related to his paragraph meaning, sentence meaning, and vocabulary achievement scores. The third hypothesis was thus accepted.

The exact nature of the relationship between the variables was not revealed in this study. The morphology and syntax scores were also found to be significantly related to the variable of mental age as shown in the respective correlations of .52 and .69. Mental age in turn was found to be related to paragraph meaning, sentence meaning, and vocabulary achievement as reflected in the respective correlations of .73, .69, and .69. One might thus expect the relationship between morphology and syntax scores and the comprehension variables to be influenced by the commonly related variable of mental age. At the time of this writing additional analysis is being completed in order to isolate the degree of contribution morphological language development and syntactical language development make in the prediction of reading comprehension achievement.

It was concluded that paragraph meaning comprehension, sentence meaning comprehension, and vocabulary achievement of first grade subjects at the end of grade one are a function of control exhibited over designated aspects of (a) their morphological language system and (b) their syntactical language system at the beginning of grade one.

Exploratory Questions

The four exploratory questions of the study investigated the relationship between four independent background variables and the dependent variables of word recognition and reading comprehension. The background variables were considered in the following order: Mental age, socioeconomic status, sex, chronological age. As previously described, the Scheffé method of contrasts was used in testing the contrasts desired for each exploratory question.

The First Exploratory Question--Mental Age

The first exploratory question of the study was as follows: Are there significant differences in (a) word recognition scores (B, P; B+, P+) and (b) reading comprehension scores (B, B+; P, P+) in the different reading programs among children of different mental age? Data relating to the mental age of the subjects were obtained from the Pintner-Cunningham Primary Test of General Ability. Raw scores were used in the classification of subjects for data treatment. The scores for the variables of word reading, word study skills, paragraph meaning comprehension, and sentence meaning comprehension were classified in the following way:

Category	Range of Standard Scores	Mental Age in Years And Months
High	78 - 134	6.6 - 11.2
Mid	67 - 77	5.7 - 6.5
Low	48 - 66	4.0 - 5.6

The scores for the variables of regular word identification and irregular word identification were categorized as follows:

Category	Range of Raw Scores	Mental Age in Years And Months
High	72 - 134	6.0 - 11.2
Low	50 - 71	4.2 - 5.11

This two-category classification was utilized because of the smaller number of subjects for which data were collected on the last two variables.

The adjusted means for the mental age breakdown of the word recognition variables, consisting of word reading, word study skills, regular word identification, and irregular word identification, are presented in Table 9.

TABLE 9

ADJUSTED MEANS FOR WORD READING, WORD STUDY SKILLS, REGULAR WORD IDENTIFICATION, AND IRREGULAR WORD IDENTIFICATION FOR TREATMENT GROUPS B, P, B+, AND P+, AS CLASSIFIED BY MENTAL AGE

Mental Age	Group B	Group P	Mean Diff.	Critical Diff.	Group B+	Group P+	Mean Diff.	Critical Diff.
WORD READING								
High	22.42 (N=40)	25.23* (N=30)	2.81	2.50	22.18 (N=53)	26.15* (N=20)	3.97	2.71
Mid	17.93 (N=40)	22.77* (N=29)	4.84	2.50	16.03 (N=41)	21.13* (N=17)	5.10	3.02
Low	12.82 (N=27)	16.96* (N=48)	4.14	2.50	11.84 (N=30)	12.67 (N=34)	.83	2.61
WORD STUDY SKILLS								
High	39.13 (N=40)	39.40 (N=30)	.27	3.37	38.85 (N=53)	43.34* (N=20)	4.49	3.65
Mid	33.70 (N=40)	36.36 (N=29)	2.66	3.37	31.48 (N=41)	37.30* (N=17)	5.82	4.07
Low	26.33 (N=27)	28.16 (N=48)	1.83	3.37	25.18 (N=30)	26.00 (N=34)	.82	3.51
REGULAR WORD IDENTIFICATION								
High	9.48 (N=23)	13.68* (N=13)	4.20	3.83	7.74 (N=23)	13.58* (N=14)	5.84	3.72
Low	1.81 (N=21)	5.60* (N=27)	3.79	3.17	1.50 (N=16)	3.50 (N=22)	2.00	3.61
IRREGULAR WORD IDENTIFICATION								
High	15.41 (N=23)	16.94 (N=13)	1.53	4.00	15.04 (N=23)	16.83 (N=14)	1.79	3.88
Low	6.65 (N=21)	7.73 (N=27)	1.08	3.31	7.83 (N=16)	5.43 (N=22)	2.40	3.77

*Contrast significant at the .05 level.

The means for the reading comprehension variables of paragraph meaning and sentence meaning comprehension, as categorized by mental age, are presented in Table 10.

TABLE 10

ADJUSTED MEANS FOR PARAGRAPH MEANING COMPREHENSION AND SENTENCE MEANING COMPREHENSION FOR TREATMENT GROUPS B, B+, P, AND P+, AS CLASSIFIED BY MENTAL AGE

Mental Age	Group B	Group B+	Mean Diff.	Critical Diff.	Group P	Group P+	Mean Diff.	Critical Diff.
PARAGRAPH MEANING								
High	23.53 (N=40)	21.00 (N=53)	2.53	2.92	21.30 (N=30)	24.89 (N=20)	3.59	4.03
Mid	17.68* (N=40)	13.44 (N=41)	4.24	3.06	17.54 (N=29)	18.50 (N=17)	.96	4.41
Low	11.63 (N=27)	8.33 (N=30)	3.30	3.61	10.76 (N=48)	8.99 (N=34)	1.77	3.06
SENTENCE MEANING								
High	38.06 (N=40)	37.49 (N=53)	.57	4.98	37.33 (N=31)	44.87* (N=20)	7.54	6.87
Mid	22.77 (N=43)	19.49 (N=43)	3.28	4.98	24.38 (N=30)	27.89 (N=20)	3.51	6.87
Low	11.41 (N=26)	10.46 (N=33)	.95	6.16	14.36 (N=49)	10.34 (N=38)	4.02	4.98

*Contrast significant at the .05 level.

Word Reading. The data found in Table 9 for the word reading mean scores, as categorized by mental age, are presented graphically in Figure 7. Subjects in Program P were found to perform significantly better than the subjects in Program B at all mental age levels. Program P+ was also found to produce significantly higher word reading scores than Program B+, with the exception of the low mental age group.

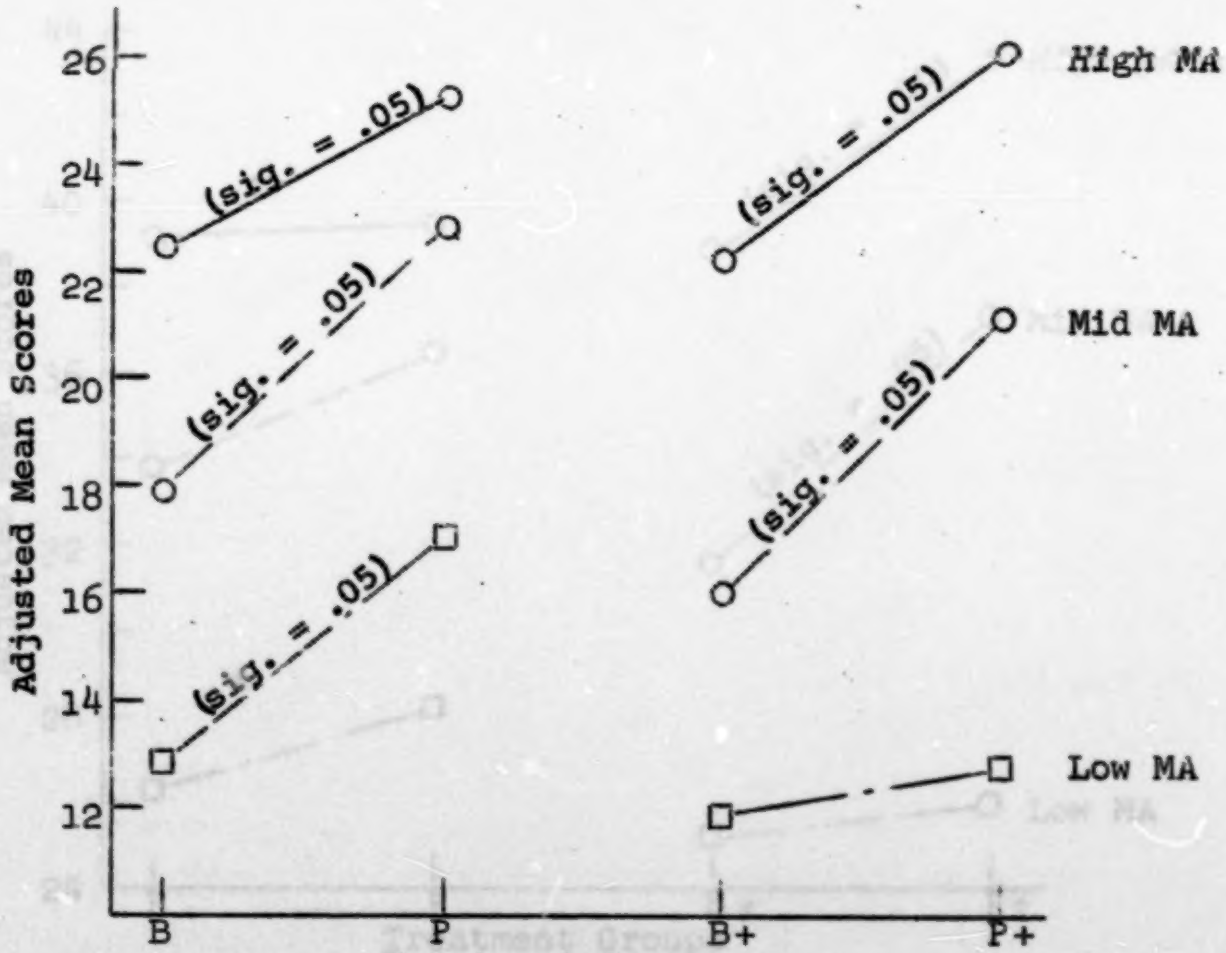

Fig. 7--Adjusted Means For the Word Reading Scores, as Categorized by Mental Age.

Word Study Skills. The data from Table 9 are presented in Figure 8. No significant difference was found between the mean scores in Program B and Program P within the various mental age levels. It is noted, however, that the greater mean values for Program P on each mental age level suggest a trend favoring that program. The mean values for Program P+ were significantly higher than for Program B+ on the mid and high mental age levels. On the low mental age level the P+ program produced a higher mean value than the B+ program, although the difference did not reach significance.

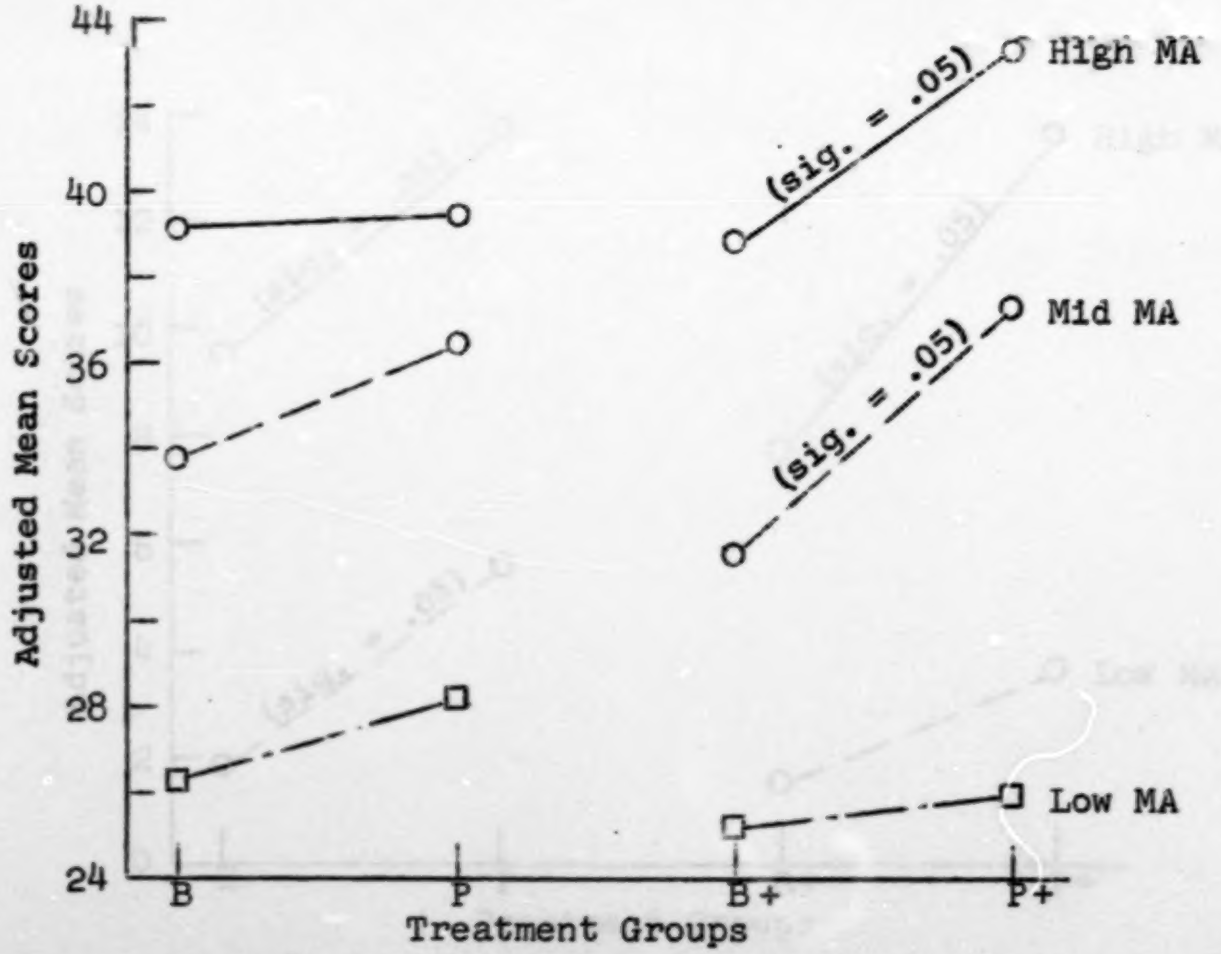

Fig. 8--Adjusted Means for the Word Study Skills Scores, as Categorized by Mental Age.

Regular Word Identification. The data from Table 9, as illustrated in Figure 9, reveal that Program P produced significantly higher mean values than Program B on both the low and high mental age levels. The P+ program mean value was significantly higher than the B+ program mean value on the high mental age category. Although no significant difference was found between the P+ and the B+ programs within the low mental age level, the degree of difference favored the P+ program.

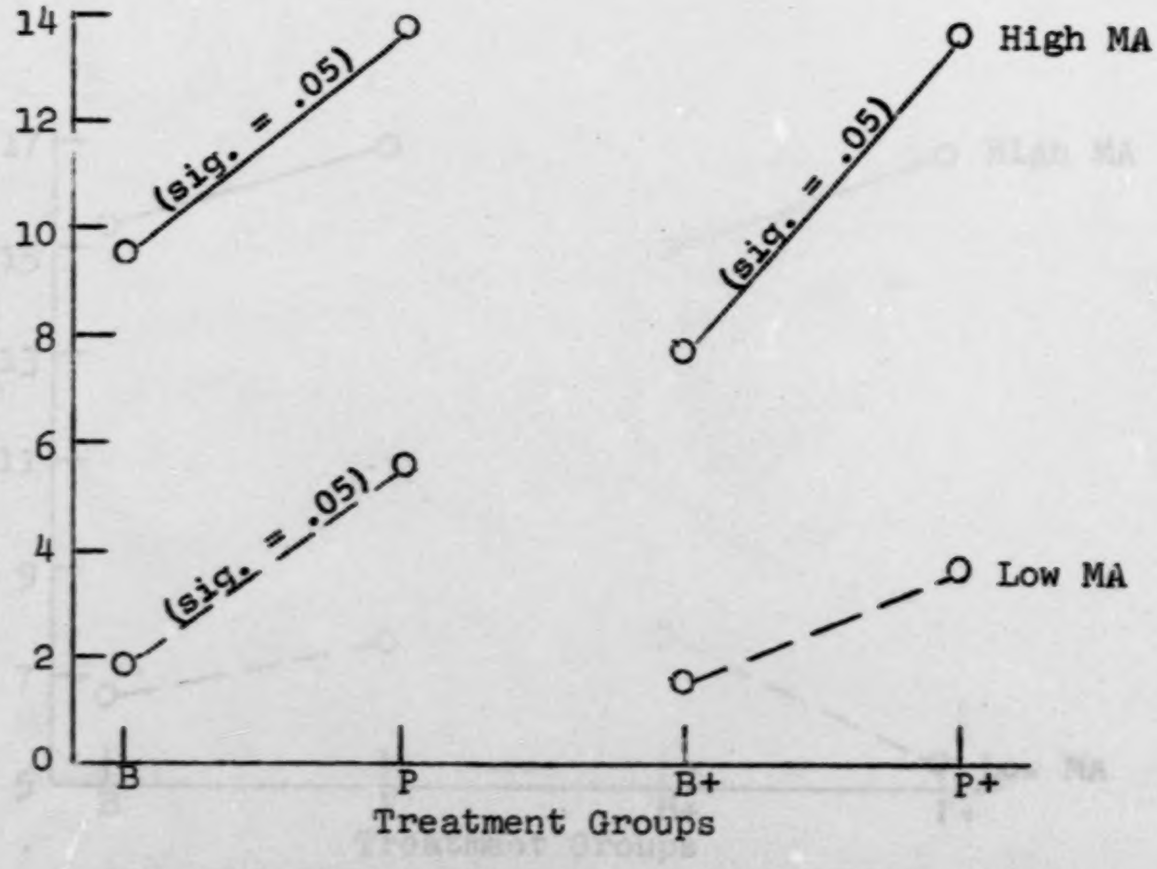

Fig. 9--Adjusted Means for the Regular Word Identification Scores, as Categorized by Mental Age.

Irregular Word Identification. As is evident in Table 9 and in Figure 10, no significant difference was found on any contrast between Program B and Program P nor between Program B+ and Program P+. It is noted, however, that within both the low and high mental age categories the mean differences favored Program P and Program P+ in contrast to Program B and Program B+ respectively, with one exception. This exception was noted between Program B+ and Program P+ on the low mental age breakdown; in this case the direction of mean difference favored Program B+.

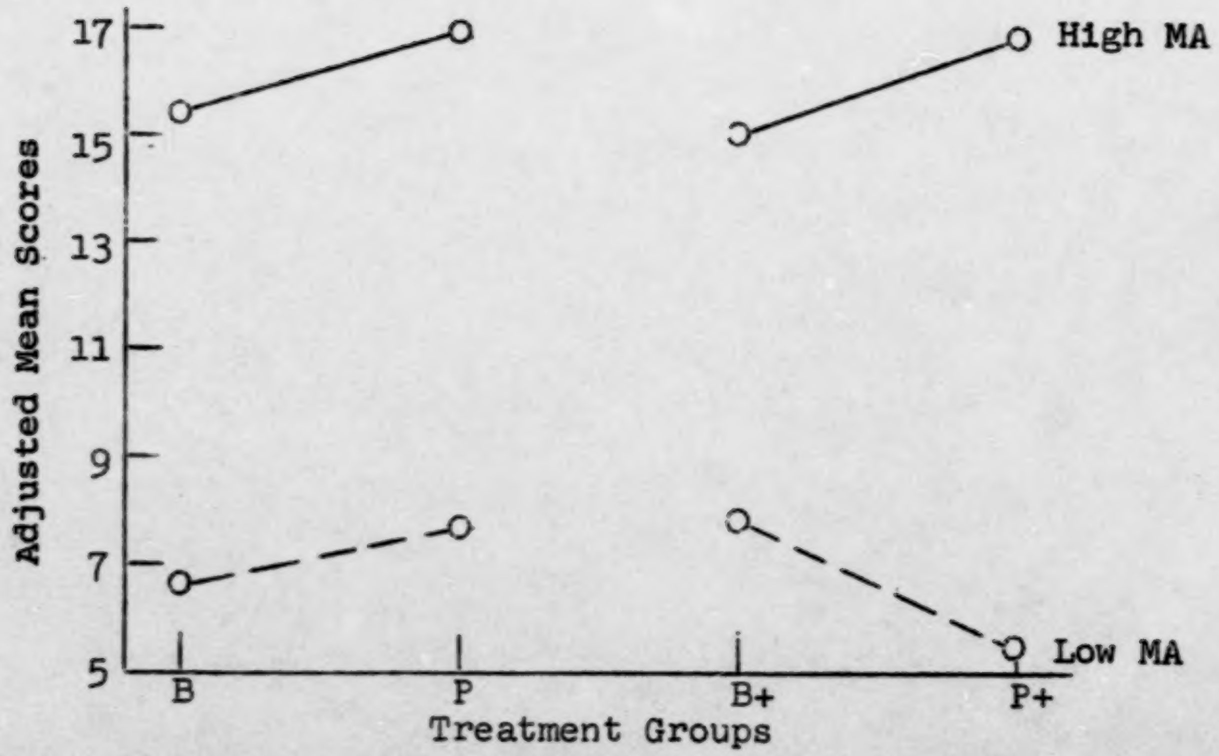

Fig. 10--Adjusted Means for the Irregular Word Identification Scores, as Categorized by Mental Age.

Paragraph Meaning. The data presented in Table 10 and illustrated in graphic form in Figure 11 reveal only one significant mean difference. This occurred within the mid mental age category favoring Program B as contrasted with Program B+. The mean differences between Program B and Program B+ favored the direction of Program B within both high and low mental age categories. Although the mean difference between Program P and Program P+ favored Program P within the low mental category, the direction of difference was reversed within the mid and high mental age range, favoring Program P+.

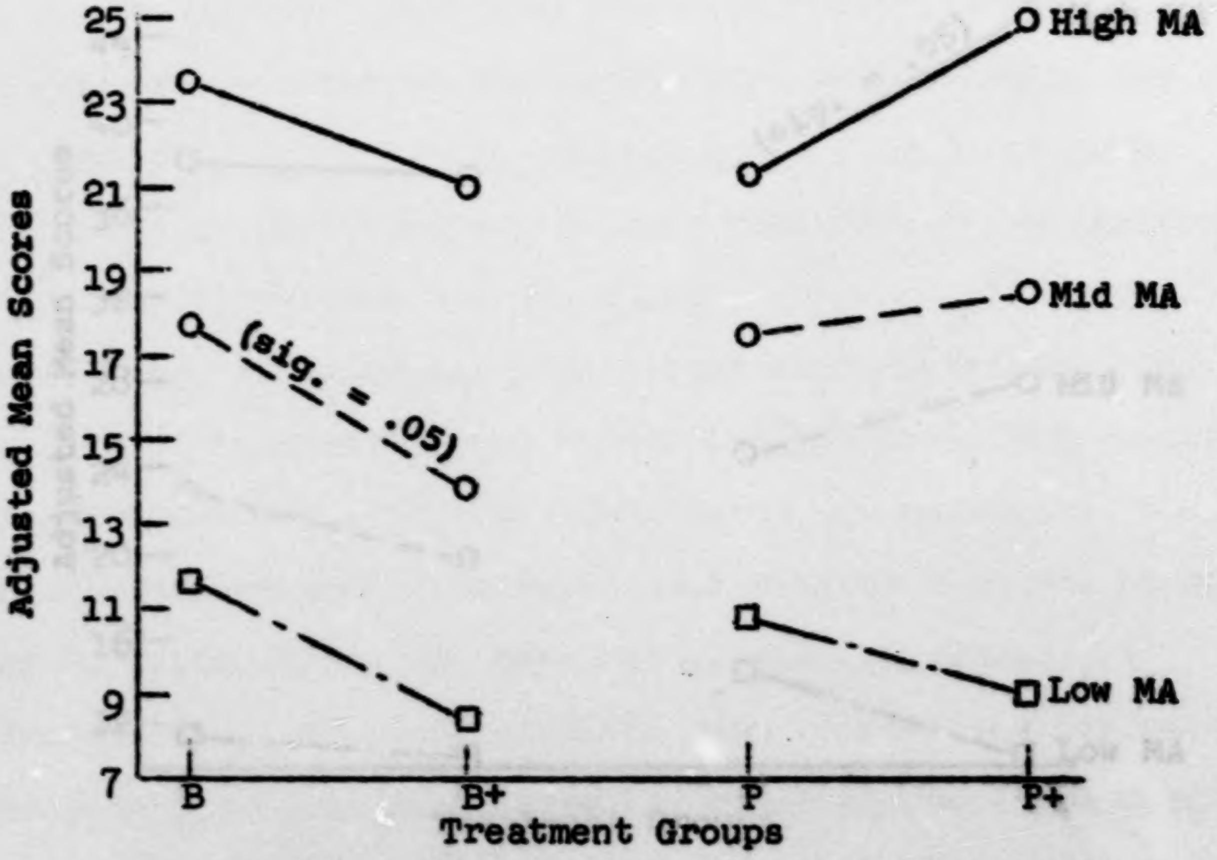

Fig. 11--Adjusted Means for the Paragraph Meaning Comprehension Scores, as Categorized by Mental Age.

Sentence Meaning Comprehension. The pattern of mean differences for sentence meaning comprehension was identical with that of paragraph meaning comprehension as revealed in Table 10 and in Figure 12. Only one significant difference was found in the data. This occurred between Program P and Program P+ within the high mental age category, favoring Program P+. The mean differences between the P+ program and the P program favored the direction of Program P+ within the mid mental age category. The reverse was true within the low mental age breakdown. Although no significant differences were found between Program B and Program B+, all mean differences were in the direction of Program B.

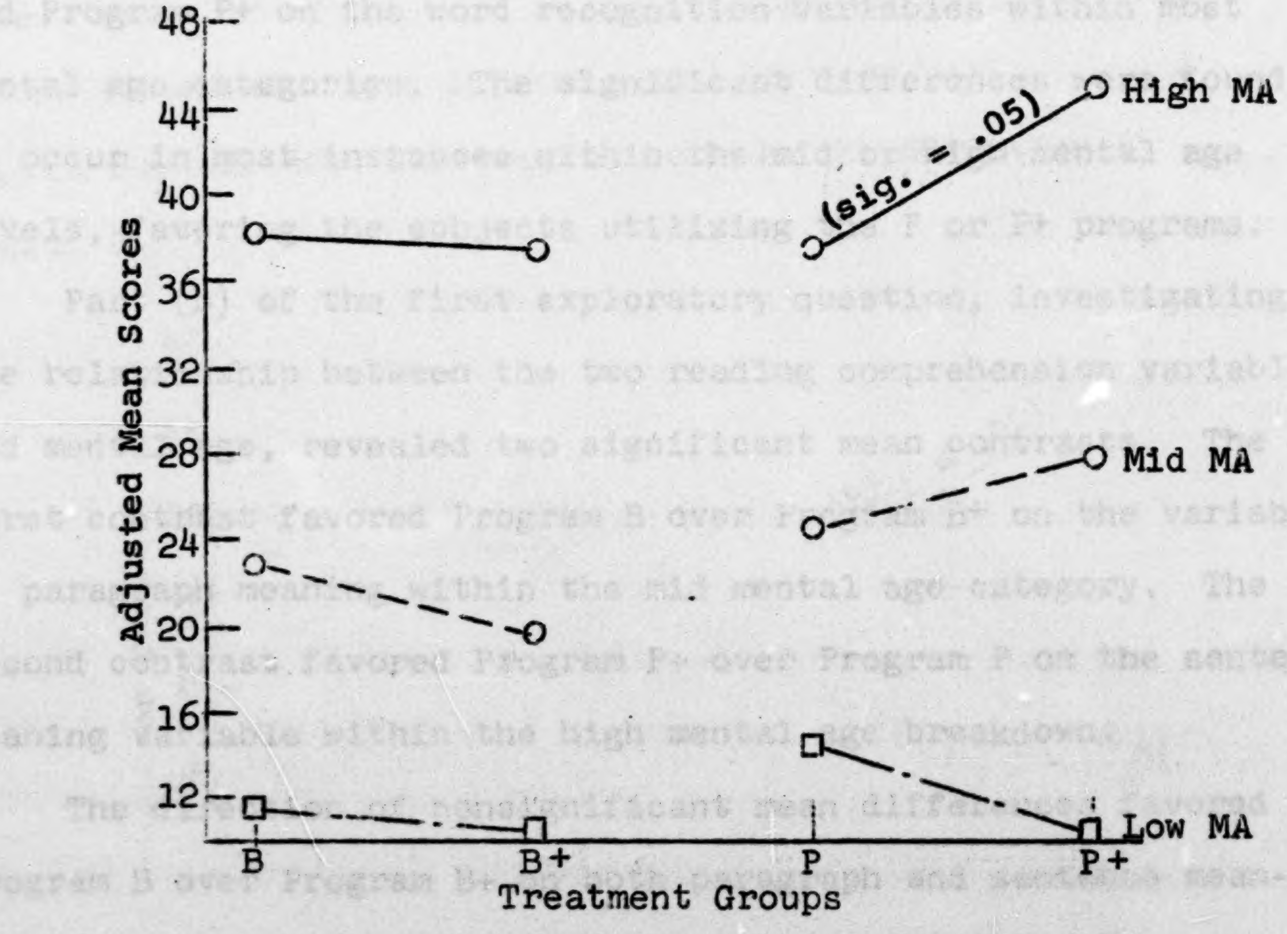

Fig. 12--Adjusted Means for the Sentence Meaning Comprehension Scores, as Categorized by Mental Age.

Summary of the First Set of Exploratory Findings

In regard to part (a) of the first exploratory question, studying the relationship between the four word recognition variables and mental age, all significant differences were found to favor Program P and Program P+ in contrast to Program B and Program B+ respectively. Likewise, all nonsignificant mean differences were found to be in the direction favoring the P or P+ programs, with one exception. This exception occurred within the low mental age breakdown on the irregular word identification variable and favored Program B+ in contrast to Program P+. The highly consistent direction of the nonsignificant mean differences serves to suggest a trend favoring Program P and Program P+ on the word recognition variables within most mental age categories. The significant differences were found to occur in most instances within the mid or high mental age levels, favoring the subjects utilizing the P or P+ programs.

Part (b) of the first exploratory question, investigating the relationship between the two reading comprehension variables and mental age, revealed two significant mean contrasts. The first contrast favored Program B over Program B+ on the variable of paragraph meaning within the mid mental age category. The second contrast favored Program P+ over Program P on the sentence meaning variable within the high mental age breakdown.

The direction of nonsignificant mean differences favored Program B over Program B+ on both paragraph and sentence meaning comprehension within all mental age categories. Mean differences were found to favor Program P+ over Program P on the paragraph and sentence meaning comprehension variables within all mental age levels, with the exception of the low mental age category. The trends suggested by the direction of the nonsignificant mean differences are reinforced by the interaction findings discussed earlier under the second hypothesis of the study. It would thus appear that the supplementary program (+) interacted differently with Program P+ than with Program B+, favoring the P+ program for the subjects classified in the mid and high mental age categories.

The specific findings related to the first exploratory question of the study are enumerated as follows.

(1) Program P and Program P+ produced significantly higher word reading scores than Program B and Program B+ respectively on all mental age levels, with one exception. This exception was within the low mental age breakdown between the mean values for Program B+ and Program P+, showing no significant difference.

(2) Program P+ produced significantly higher word study skills scores than Program B+ within the mid and high mental age categories.

(3) Program P and Program P+ produced significantly higher mean values than Program B and Program B+ respectively on the regular word identification variable, with one exception. This exception resulted from a nonsignificant difference between Programs B+ and P+ within the low mental age breakdown.

(4) No significant differences were found between any program on the irregular word identification variable.

(5) The highly consistent direction of the nonsignificant mean differences suggests a trend favoring Program P and Program P+ on the four word recognition variables within most mental age categories.

(6) Program B was found to produce significantly higher paragraph meaning comprehension scores with the mid mental age category than Program B+.

(7) Program P+ produced significantly higher sentence meaning comprehension scores than Program P within the high mental age category.

(8) The consistent direction of the nonsignificant mean differences on the paragraph meaning and sentence meaning comprehension variables suggests that the supplementary aspect (+) of the programs interacted differently with Program P+ than with Program B+, favoring the P+ program for subjects in the mid and high mental age categories.

The Second Exploratory Question--Socioeconomic Status

The second exploratory question of the study stated: Are there significant differences in (a) word recognition scores (B,P; B+,P+) and (b) reading comprehension scores (B,B+; P,P+) in the different reading programs among children of different levels of socioeconomic status? The Minnesota Scale for Paternal Occupations was used to categorize the subjects in terms of socioeconomic status. The word reading, word study skills, paragraph meaning comprehension, and sentence meaning comprehension variables were ordered in the following categories:

Category	Level Identified in the Minn. Scale for Paternal Occupations
High	1,2,3
Mid	4,5
Low	6,7

Because of the small number of subjects for which data were obtained on the regular word identification and irregular word identification variables, the following two categories were utilized:

Category	Level Identified in the Minn. Scale for Paternal Occupations
High	1,2,3,4
Low	5,6,7

The adjusted means within the socioeconomic levels for the word reading, word study skills, regular word identification, and irregular word identification scores are presented in Table 11.

TABLE 11

ADJUSTED MEANS FOR WORD READING, WORD STUDY SKILLS, REGULAR WORD IDENTIFICATION, AND IRREGULAR WORD IDENTIFICATION FOR TREATMENT GROUPS B, P, B+, AND P+, AS CLASSIFIED BY SOCIOECONOMIC STATUS

S.E.S.	Group B	Group P	Mean Diff.	Critical Diff.	Group B+	Group P+	Mean Diff.	Critical Diff.
WORD READING								
High	19.41 (N=33)	23.10* (N=45)	3.69	2.41	19.76 (N=51)	22.90* (N=24)	3.14	2.62
Mid	18.33 (N=48)	20.62 (N=36)	2.29	2.31	17.71 (N=37)	19.94 (N=17)	2.23	3.04
Low	15.82 (N=30)	17.91 (N=30)	2.09	2.62	14.49 (N=37)	14.57 (N=31)	.08	2.52
WORD STUDY SKILLS								
High	35.39 (N=33)	36.56 (N=45)	1.17	3.28	36.01 (N=51)	39.47 (N=24)	3.46	3.57
Mid	34.31 (N=48)	33.81 (N=36)	.50	3.14	33.77 (N=37)	36.14 (N=17)	2.37	4.14
Low	29.53 (N=30)	28.79 (N=30)	.74	3.57	28.14 (N=37)	27.91 (N=31)	.23	3.42
REGULAR WORD IDENTIFICATION								
High	8.86 (N=12)	11.26 (N=17)	2.40	4.27	6.57 (N=23)	12.62* (N=10)	6.05	4.27
Low	4.83 (N=31)	6.76 (N=23)	1.93	2.98	3.18 (N=16)	7.17* (N=29)	3.99	3.45
IRREGULAR WORD IDENTIFICATION								
High	14.59 (N=12)	14.25 (N=17)	.34	4.39	13.61 (N=23)	15.37 (N=10)	1.76	4.37
Low	10.16 (N=31)	9.29 (N=23)	.87	3.95	9.88 (N=16)	9.36 (N=29)	.52	3.53

*Contrast significant at the .05 level.

The adjusted means categorized by socioeconomic status levels for paragraph meaning comprehension and sentence meaning comprehension are presented in Table 12.

TABLE 12

ADJUSTED MEANS FOR PARAGRAPH MEANING COMPREHENSION AND SENTENCE MEANING COMPREHENSION FOR TREATMENT GROUPS B, B+, P, AND P+, AS CLASSIFIED BY SOCIOECONOMIC STATUS

S.E.S.	Group B	Group B+	Mean Diff.	Critical Diff.	Group P	Group P+	Mean Diff.	Critical Diff.
PARAGRAPH MEANING								
High	19.79 (N=33)	17.98 (N=51)	1.81	3.16	18.33 (N=45)	20.94 (N=24)	2.61	3.59
Mid	18.23 (N=48)	15.36 (N=37)	2.87	3.02	15.24 (N=36)	17.31 (N=17)	2.07	3.73
Low	15.60* (N=30)	11.95 (N=37)	3.65	3.59	12.39 (N=30)	11.52 (N=31)	.87	3.59
SENTENCE MEANING								
High	29.74 (N=32)	30.71 (N=53)	.97	5.31	30.69 (N=43)	37.38* (N=24)	6.69	6.04
Mid	24.41 (N=50)	24.01 (N=41)	.40	5.07	21.34 (N=41)	26.55 (N=22)	5.21	6.28
Low	21.53 (N=30)	16.11 (N=36)	5.42	6.04	17.40 (N=31)	12.37 (N=34)	5.03	6.04

*Contrast significant at the .05 level.

Word Reading. The data reported in Table 11 and presented graphically in Figure 13 reveal that two significant differences were present on the word reading variable. These differences occurred within the high socioeconomic level between Program B and Program P and between Program B+ and Program P+. In both cases the mean values for Programs P and P+ were significantly higher than the values for Programs B and B+ respectively. Although no other significant differences were present, the mean values favored Programs P and P+ over Programs B and B+ in the mid and low socioeconomic levels for all comparisons.

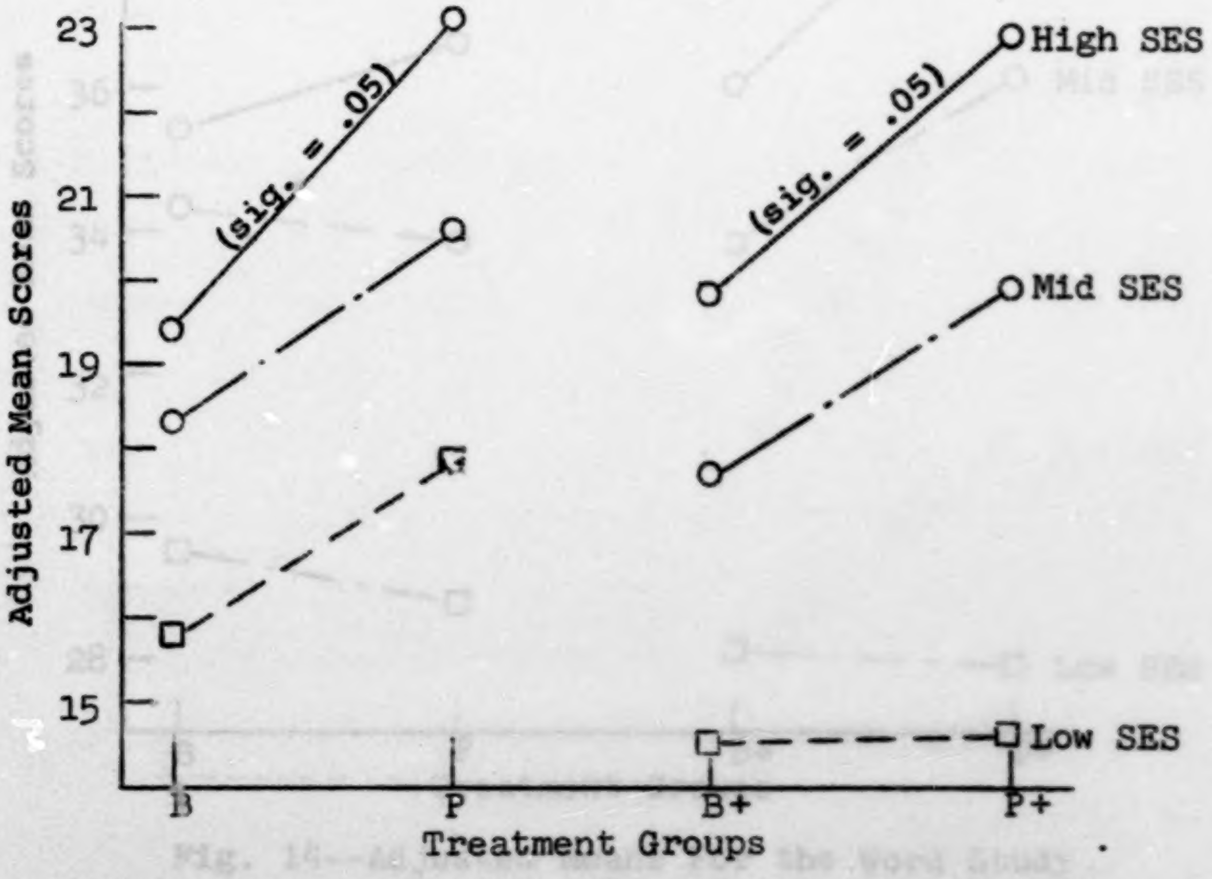

Fig. 13--Adjusted Means For the Word Reading Scores, as Categorized by Socioeconomic Status.

Word Study Skills. The data presented in Table 11 and plotted graphically in Figure 14 indicated that no significant mean differences were in evidence on any contrast. The nonsignificant mean differences favored Program P in the high socioeconomic category and Program P+ in the high and mid socioeconomic breakdown. The direction of the mean differences favored Program B and Program B+ in the remaining instances.

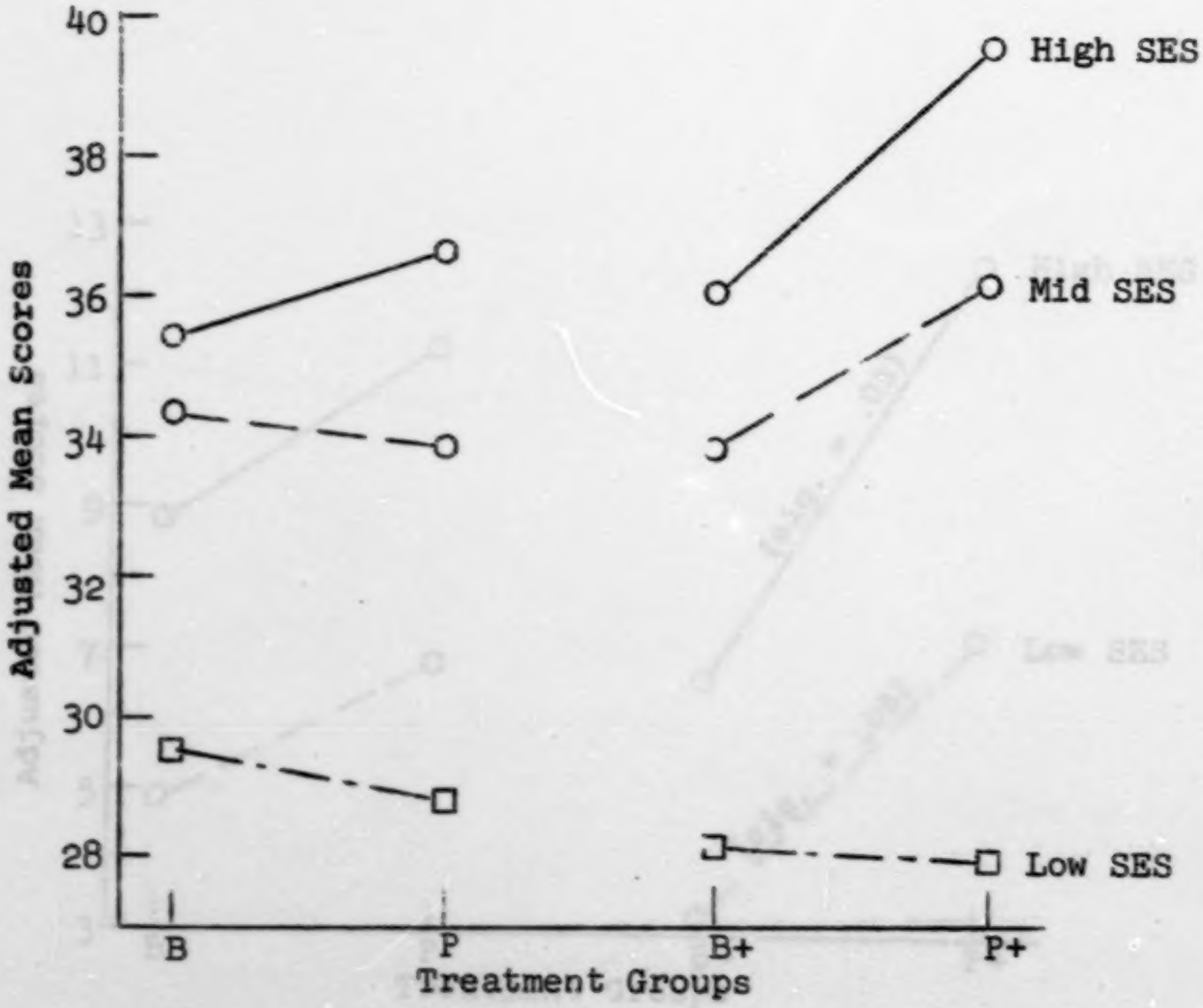

Fig. 14--Adjusted Means For the Word Study Skills Scores, as Categorized by Socioeconomic Status.

Regular Word Identification. Two significant differences were noted in Table 11 and in Figure 15. These occurred between the mean values for Program P+ and Program B+, favoring the P+ program within the high and low socioeconomic categories. Although the mean value differences between Program B and Program P did not reach significance on the high and low socioeconomic levels, the direction of the differences favored Program P.

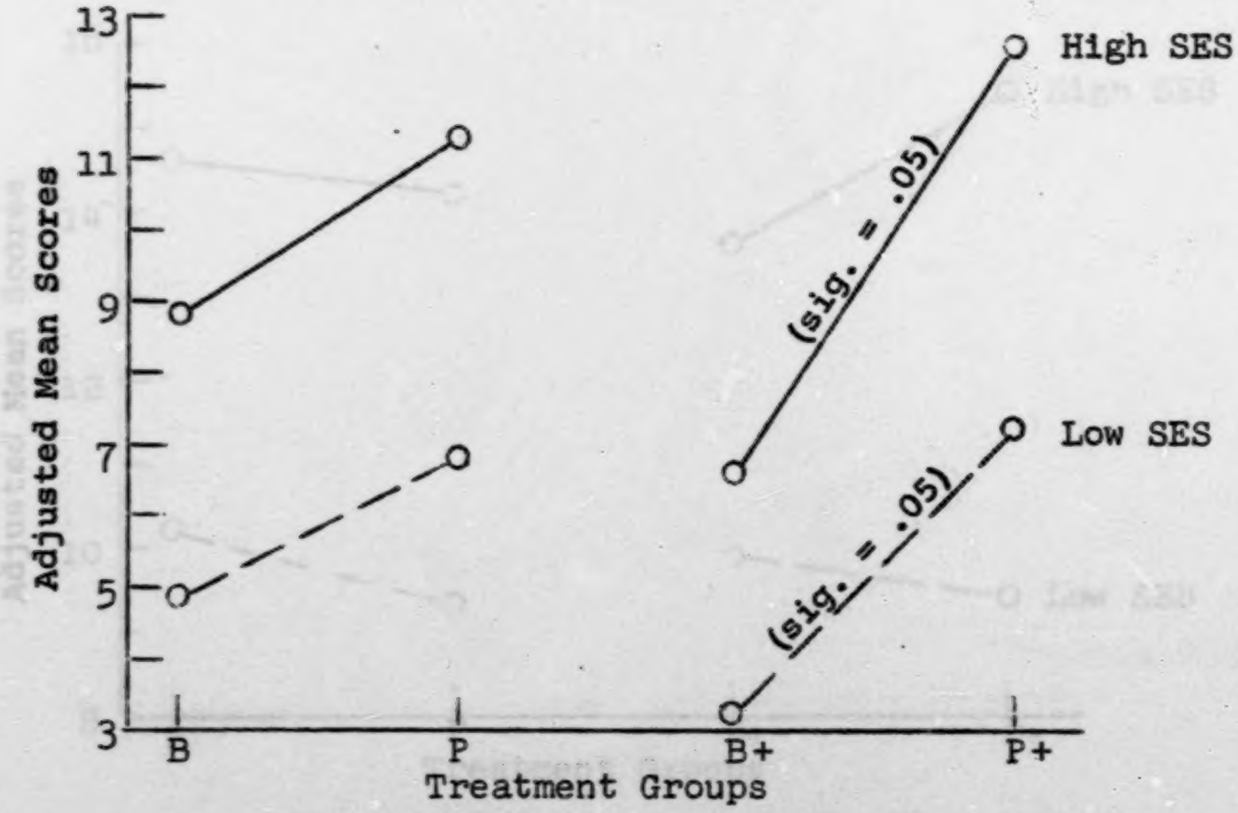

Fig. 15--Adjusted Means for the Regular Word Identification Scores, as Categorized by Socioeconomic Status.

Irregular Word Identification. No significant differences were found between the mean values on any contrast. The direction of the nonsignificant mean differences favored Program B in contrast to Program P on the high and low socioeconomic levels. While the mean difference favored Program P+ over Program B+ on the high socioeconomic level, the reverse was true for the low socioeconomic category.

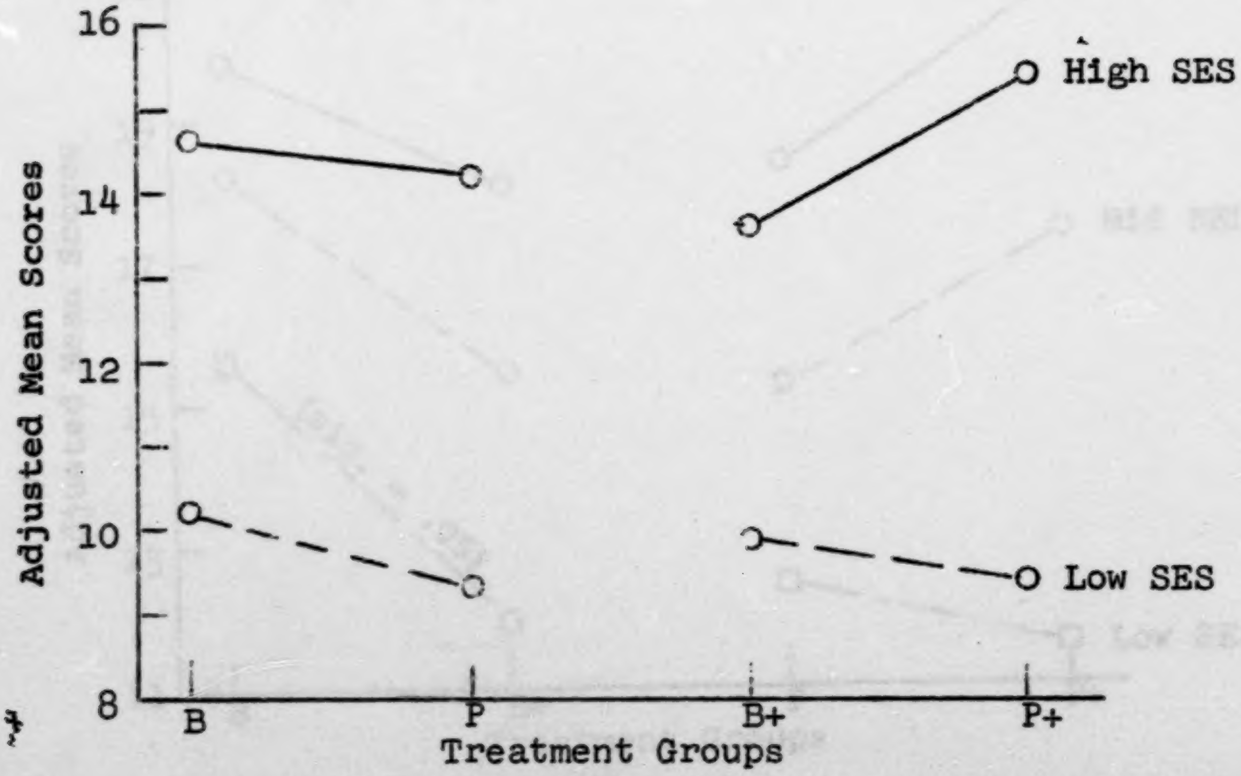

Fig. 16--Adjusted Means for the Irregular Word Identification Scores, as Categorized by Socioeconomic Status.

Paragraph Meaning. The data presented in Table 12 and graphically illustrated in Figure 17 reveal only one significant difference present on the paragraph meaning comprehension variable. This occurred between Program B and Program B+ on the low socioeconomic level, favoring Program B. The direction of the nonsignificant mean differences also favored Program B on the mid and high socioeconomic levels as well as Program P over Program P+ on the low socioeconomic level. The direction of mean difference favored Program P+ over Program P within the mid and high socioeconomic categories.

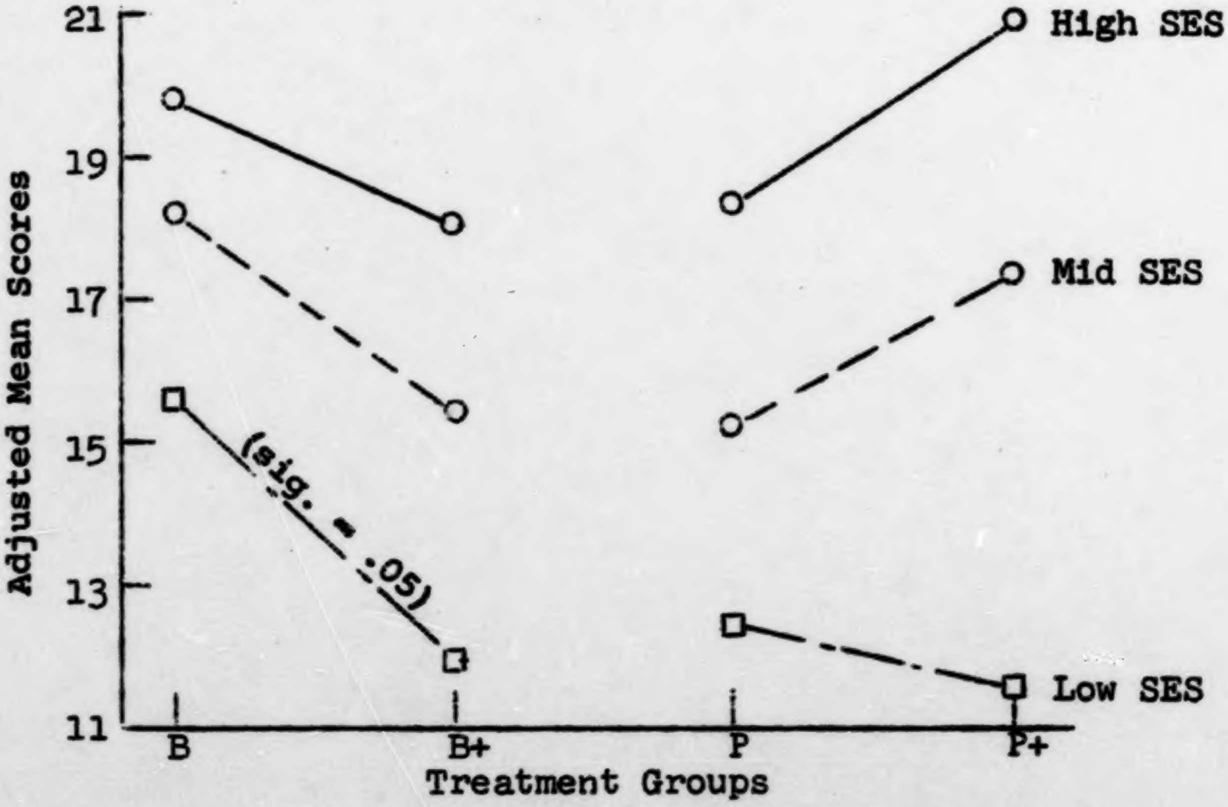

Fig. 17--Adjusted Means For the Paragraph Meaning Comprehension Scores, as Categorized by Socioeconomic Status.

Sentence Meaning. The pattern of mean differences presented in Table 12 and Figure 18 for the sentence meaning variable was very similar to the pattern evident for the paragraph meaning comprehension variable. Only one significant mean difference was found. This occurred between Program P+ and Program P within the high socioeconomic level and favored the direction of the P+ program. The nonsignificant mean differences also favored Program P+ within the mid socioeconomic category. Program B+ produced a slightly higher mean value than Program B on the high socioeconomic level. All other mean values favored the direction of Program B or Program P in contrast to Program B+ and Program P+.

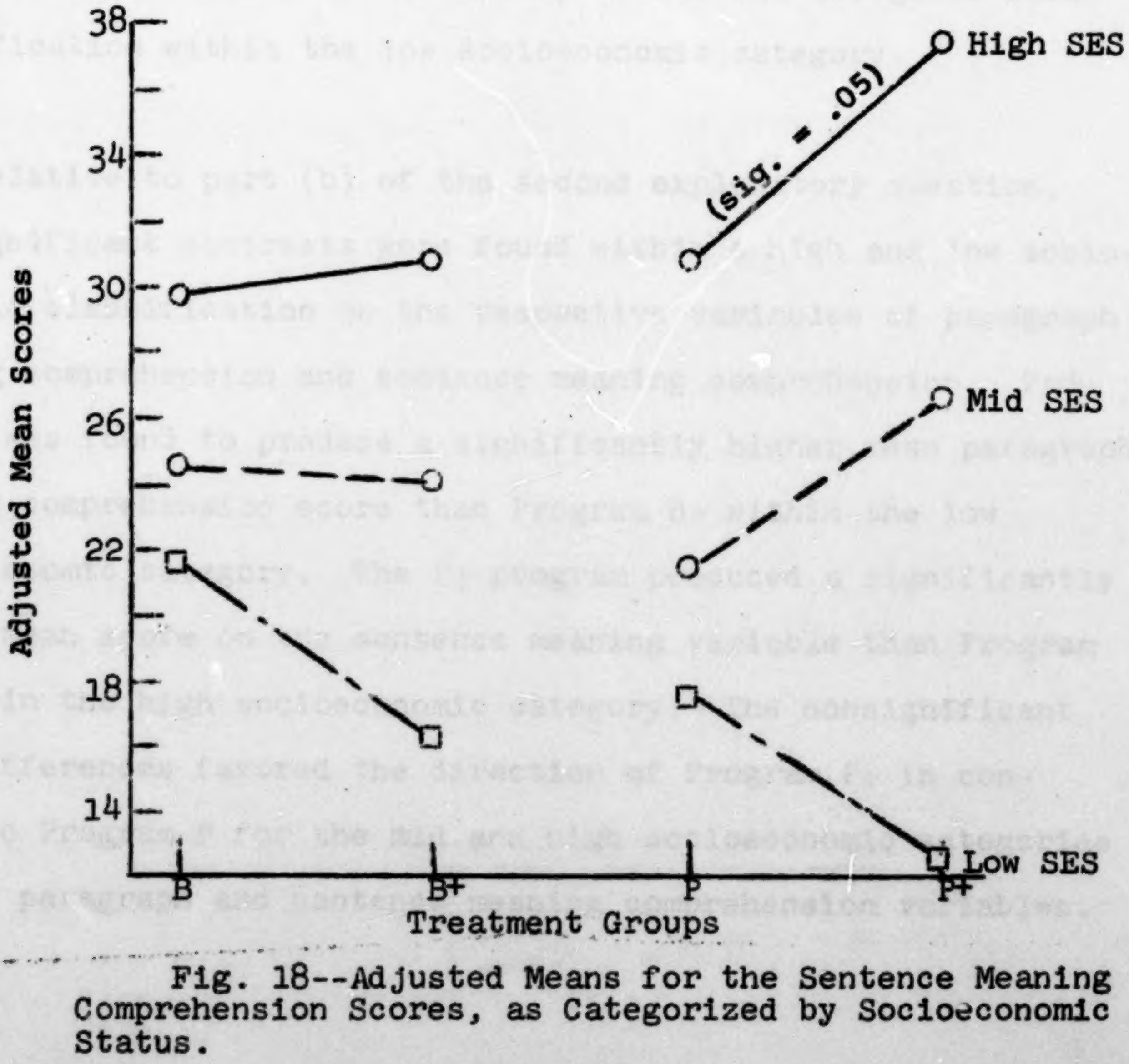

Fig. 18--Adjusted Means for the Sentence Meaning Comprehension Scores, as Categorized by Socioeconomic Status.

Summary of the Second Set of Exploratory Findings

Part (a) of the second exploratory question examined the relationship between the four word recognition variables and socioeconomic status. Four significant differences were found to favor either Program P or Program P+ in contrast to Program B or Program B+, respectively, within the mid and high socioeconomic categories. These differences were found on the word reading and regular word identification variables. The direction of the nonsignificant mean differences in the majority of cases likewise favored the P or P+ programs over the B or B+ programs in the mid or high socioeconomic levels. The mean differences favored the B and B+ programs in contrast to the P and P+ programs on the variables of word study skills and irregular word identification within the low socioeconomic category.

Relative to part (b) of the second exploratory question, two significant contrasts were found within a high and low socioeconomic classification on the respective variables of paragraph meaning comprehension and sentence meaning comprehension. Program B was found to produce a significantly higher mean paragraph meaning comprehension score than Program B+ within the low socioeconomic category. The P+ program produced a significantly higher mean score on the sentence meaning variable than Program B+ within the high socioeconomic category. The nonsignificant mean differences favored the direction of Program P+ in contrast to Program P for the mid and high socioeconomic categories for the paragraph and sentence meaning comprehension variables.

The mean values for Program B were found to be of greater magnitude than the values for Program B+ within the mid and low socioeconomic categories for the paragraph and sentence meaning comprehension variables.

These findings suggest that the supplementary aspect (+) of the programs interacted differently with Program P+ than with Program B+ for the subjects in the mid and high socioeconomic levels. This finding is similar to that previously discussed under the first exploratory question dealing with mental age levels.

Specific findings encompassed in the second exploratory question include the following:

(1) Program P and Program P+ produced significantly higher word reading mean scores than Program B and Program B+ respectively for the subjects categorized in the high socioeconomic status level.

(2) Program P+ was found to produce significantly higher regular word identification scores than Program P for subjects in the high and low socioeconomic status categories.

(3) Within the mid and high socioeconomic levels the direction of the nonsignificant mean values for the word recognition variables most often favored Programs P and P+ over Programs B and B+ respectively. The reverse was true for the subjects in the low socioeconomic categories.

(4) Program B produced a significantly higher paragraph meaning mean value than Program B+ within the low socioeconomic level.

(5) The sentence meaning comprehension mean value for Program P+ was found to be significantly higher than the mean value for Program P within the high socioeconomic category.

(6) The supplementary aspect (+) of the programs appeared to have interacted differently with Program P+ than with Program B+, favoring the P+ program for subjects in the mid and high socioeconomic levels for both paragraph meaning and sentence meaning comprehension values.

The Third Exploratory Question--Sex

The third exploratory question of the study asked: Are there significant differences between children of different sex in (a) word recognition scores (B,P; B+,P+), and (b) reading comprehension scores (B,B+; P,P+), in the different reading programs? The information pertaining to the sex of the subjects was obtained from school records.

The data relative to the word recognition variables as categorized by sex are presented in Table 13.

TABLE 13

ADJUSTED MEANS FOR WORD READING, WORD STUDY SKILLS, REGULAR WORD IDENTIFICATION, AND IRREGULAR WORD IDENTIFICATION FOR TREATMENT GROUPS B, P, B+, AND P+, AS CLASSIFIED BY SEX

Sex	Group B	Group P	Mean Diff.	Critical Diff.	Group B+	Group P+	Mean Diff.	Critical Diff.
WORD READING								
Male	18.14 (N=54)	20.69* (N=58)	2.55	1.97	18.05 (N=52)	19.61 (N=36)	1.56	2.31
Female	17.65 (N=58)	21.26* (N=50)	3.61	1.97	17.26 (N=73)	17.61 (N=36)	.35	2.08
WORD STUDY SKILLS								
Male	33.54 (N=54)	33.24 (N=58)	.30	2.71	33.49 (N=52)	34.86 (N=36)	1.37	3.17
Female	33.10 (N=58)	34.13 (N=50)	1.03	2.71	32.68 (N=73)	32.56 (N=36)	.12	2.86
REGULAR WORD IDENTIFICATION								
Male	6.55 (N=22)	8.69 (N=26)	2.14	3.18	6.91 (N=20)	7.98 (N=17)	1.07	3.61
Female	5.08 (N=22)	8.07 (N=15)	2.99	3.72	3.36 (N=19)	6.92 (N=19)	3.56	3.61
IRREGULAR WORD IDENTIFICATION								
Male	11.91 (N=22)	11.27 (N=26)	.64	3.32	13.90 (N=20)	10.34 (N=17)	3.56	3.78
Female	10.54 (N=22)	10.86 (N=15)	.32	3.90	10.16 (N=19)	9.43 (N=19)	.73	3.78

*Contrast significant at the .05 level.

The adjusted means for the comprehension variables as categorized by sex are presented in Table 14.

TABLE 14

ADJUSTED MEANS FOR PARAGRAPH MEANING COMPREHENSION AND SENTENCE MEANING COMPREHENSION FOR TREATMENT GROUPS B, B+, P, AND P+, AS CLASSIFIED BY SEX

Sex	Group B	Group B+	Mean Diff.	Critical Diff.	Group P	Group P+	Mean Diff.	Critical Diff.
PARAGRAPH MEANING								
Male	17.53 (N=54)	15.19 (N=52)	2.34	2.71	14.81 (N=36)	16.51 (N=58)	1.70	3.92
Female	18.25* (N=58)	15.58 (N=73)	2.67	2.57	16.72 (N=50)	15.55 (N=36)	1.17	3.17
SENTENCE MEANING								
Male	24.56 (N=58)	24.23 (N=53)	.33	4.56	22.82 (N=61)	25.79 (N=42)	2.97	4.80
Female	25.80 (N=54)	24.75 (N=77)	1.05	4.32	25.14 (N=51)	21.54 (N=38)	3.60	5.09

*Contrast significant at the .05 level.

Word Reading. The data in Table 13, which are graphically presented in Figure 19, indicate that Program P resulted in significantly higher word reading mean values for both male and female subjects. Although the mean differences were not of sufficient magnitude to reach significance, the direction of differences favored the P+ program in contrast to the B+ program for both sexes.

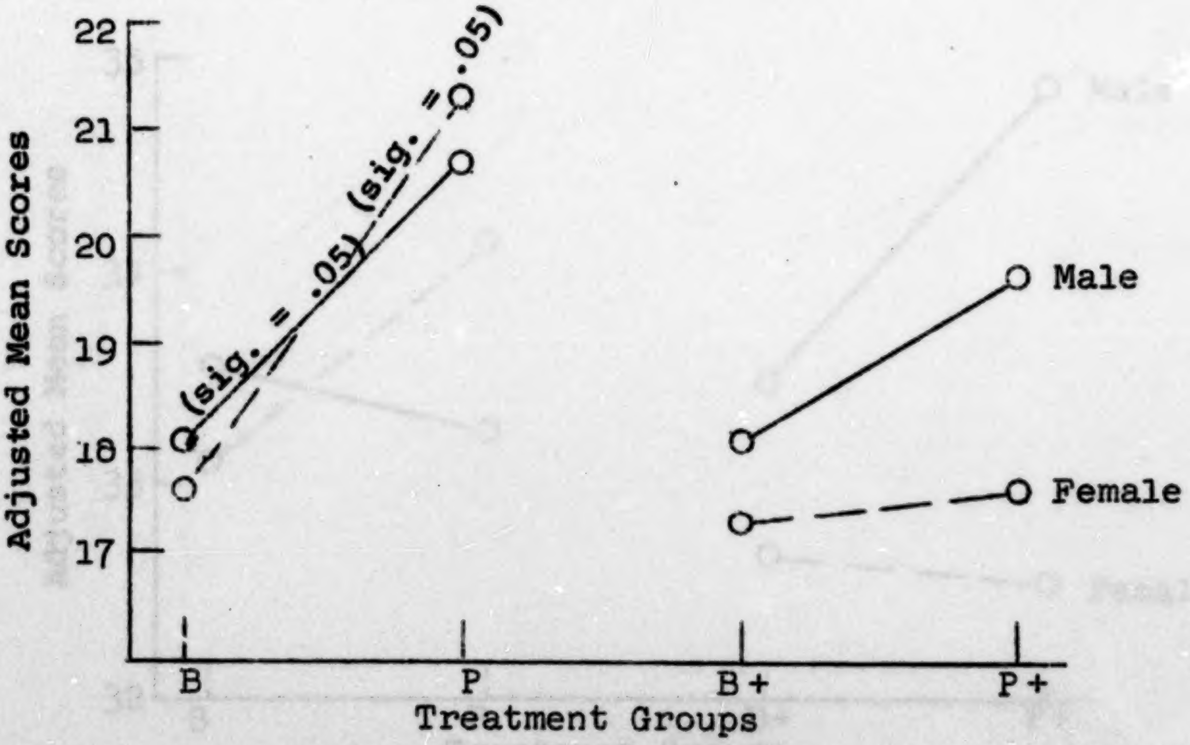

Fig. 19--Adjusted Means for the Word Reading Scores, as Categorized by Sex.

Word Study Skills. No significant difference was found on any contrast within the male or the female category on the word study skills variable. The direction of the nonsignificant mean differences, however, presents an unusual pattern, as shown in Table 13 and illustrated in Figure 20. While the mean value for the boys was slightly greater in Program B as contrasted with Program P, the P+ program was found to produce a higher mean value than Program B+. A reverse pattern was evident for the girls. This difference suggests a possible trend which could be interpreted to mean the supplementary aspect (+) of the programs interacts differently with sex and is of greater significance for boys than for girls on the word study skills variable. Data in the second year of the study should be carefully observed for mean differences which could support or reject such an interpretation.

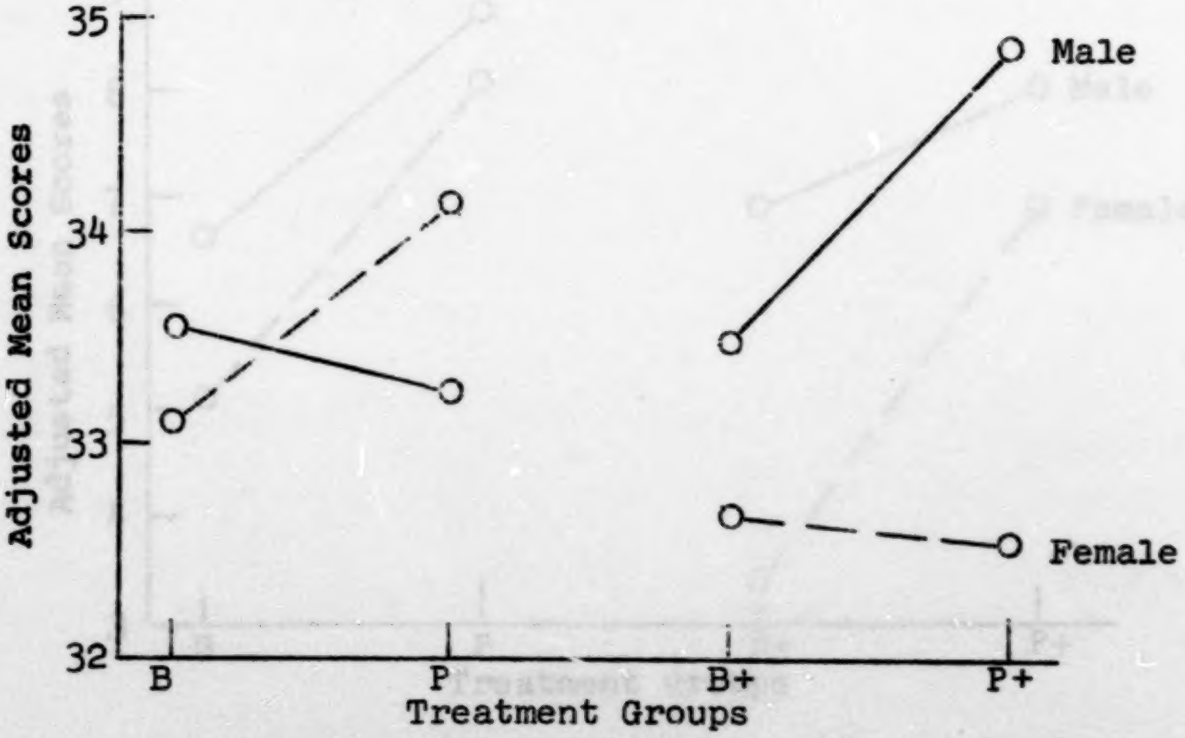

Fig. 20--Adjusted Means for Word Study Skills Scores, as Categorized by Sex.

Regular Word Identification. No significant difference was found within the male or the female category on the regular word identification variable. It is noted in Table 13 and Figure 21, however, that the direction of the mean differences favored Programs P and P+ in contrast to Programs B and B+ respectively.

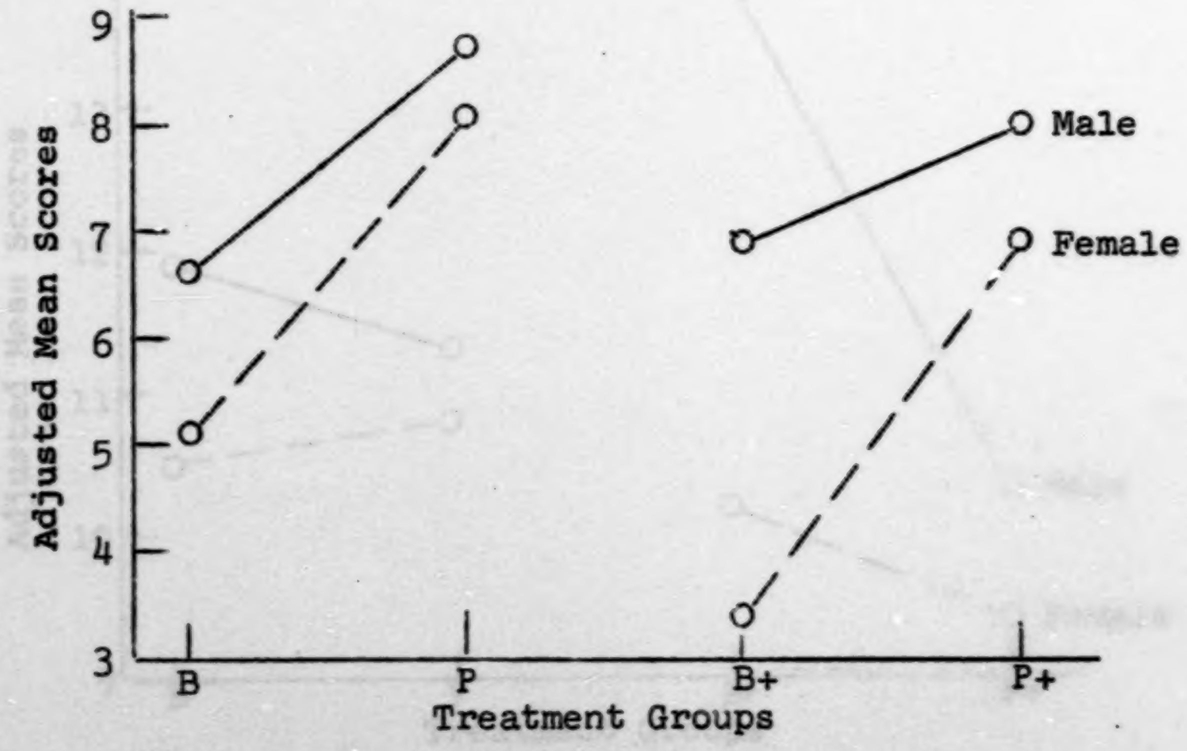

Fig. 21--Adjusted Means for Regular Word Identification Scores, as Categorized by Sex.

Irregular Word Identification. As shown in Table 13 and illustrated in Figure 22, the means for the irregular word identification variable were not found to differ significantly between reading programs within the different sex categories. The direction of the nonsignificant mean values favored Program B+ over Program P+ within both male and female categories. Although Program B was favored within the male category as contrasted to Program P, the reverse was true for the female category.

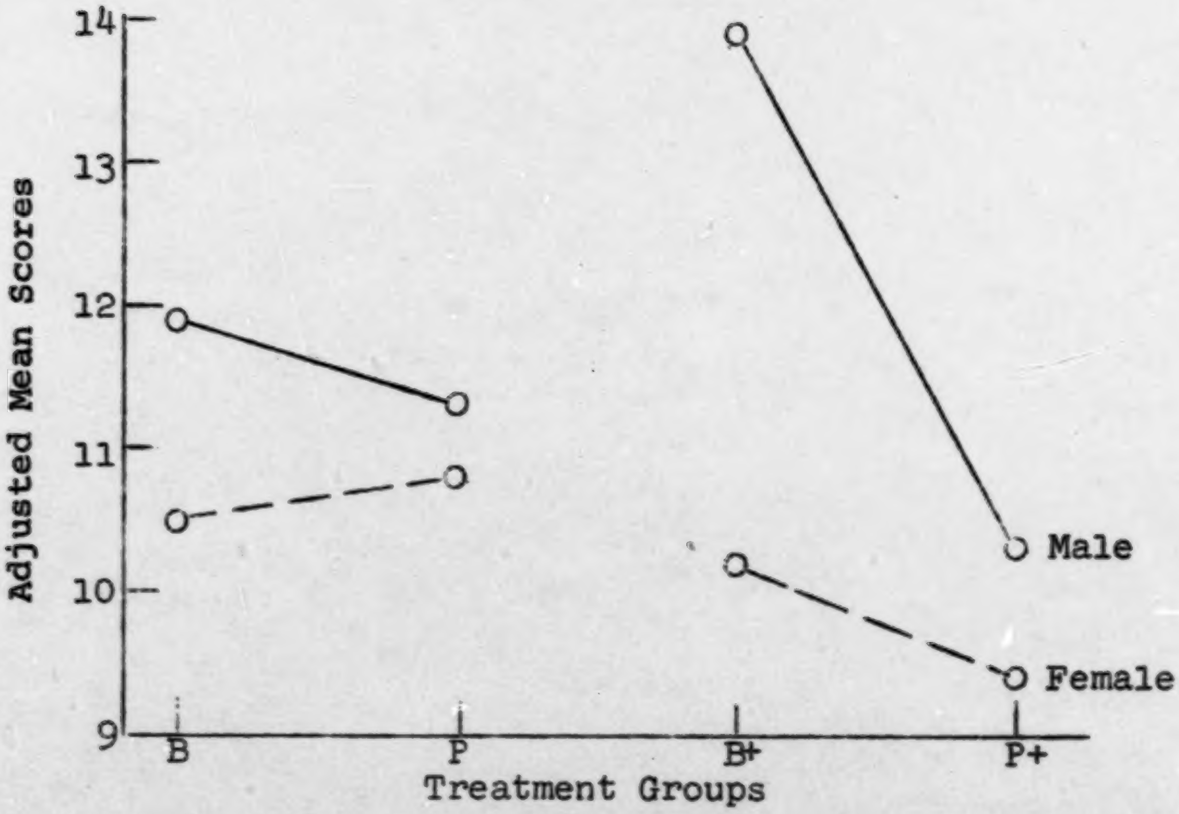

Fig. 22--Adjusted Means for Irregular Word Identification Scores, as Categorized by Sex.

Paragraph Meaning. Table 14 and Figure 23 reveal that only one significant difference was present on the reading program contrasts within the sex categories. This significant mean difference was found to favor Program B over Program B+ within the female category on the paragraph meaning variable. The direction of the nonsignificant mean differences favored Program B in contrast to Program B+. It is observed, however, that the direction of mean differences for males and females varied for Program P and Program P+. The mean difference within the male category favored the P+ program over the P program. In the female category, however, the reverse was true with the P program resulting in a higher mean value than the P+ program.

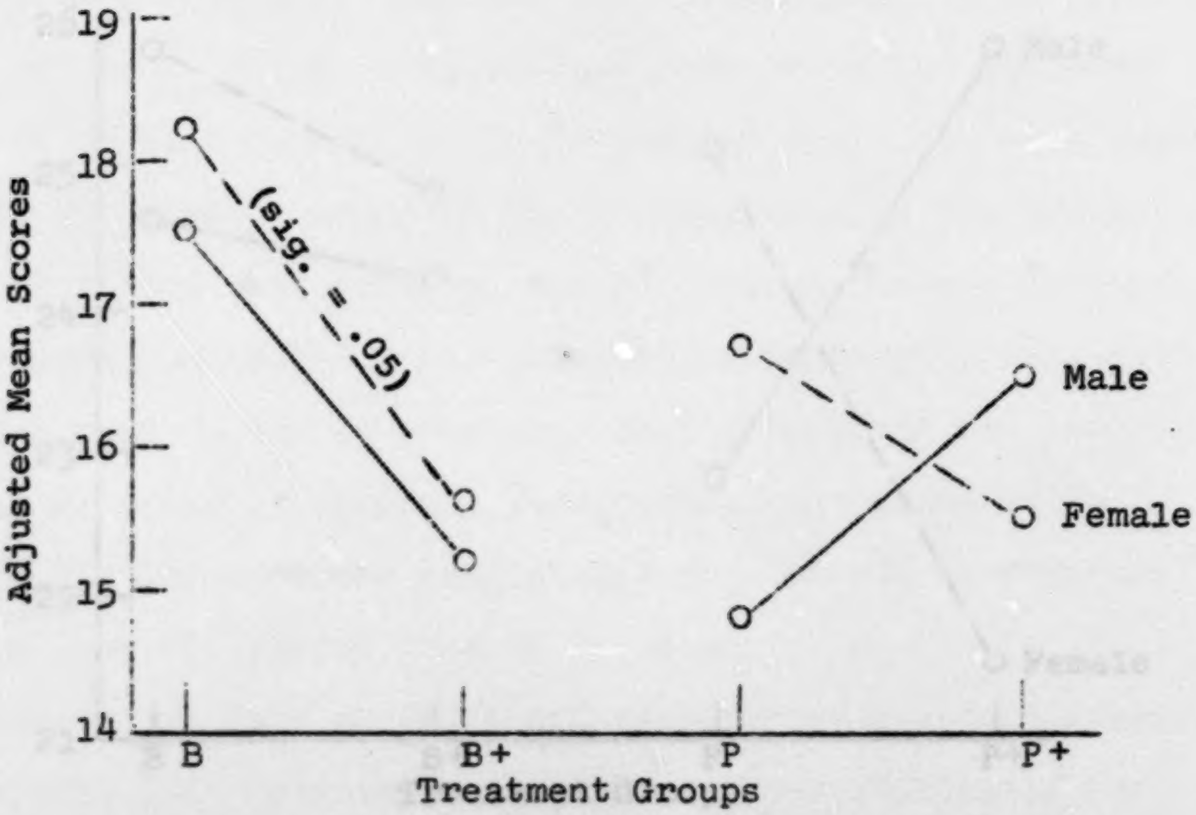

Fig. 23--Adjusted Means for Paragraph Meaning Comprehension Scores, as Categorized by Sex.

Sentence Meaning. As indicated in Table 14, no significant difference was found on any contrast within the sex breakdown. The pattern of nonsignificant mean differences for the sentence meaning variable was found to be identical with that for the paragraph meaning variable, as is evident in Figure 24. The direction of mean difference favored Program B over Program B+ for both male and female categories. The mean difference favored the direction of the P+ program in contrast to the P program within the male category. Within the female classification, however, the mean difference favored Program P over Program P+.

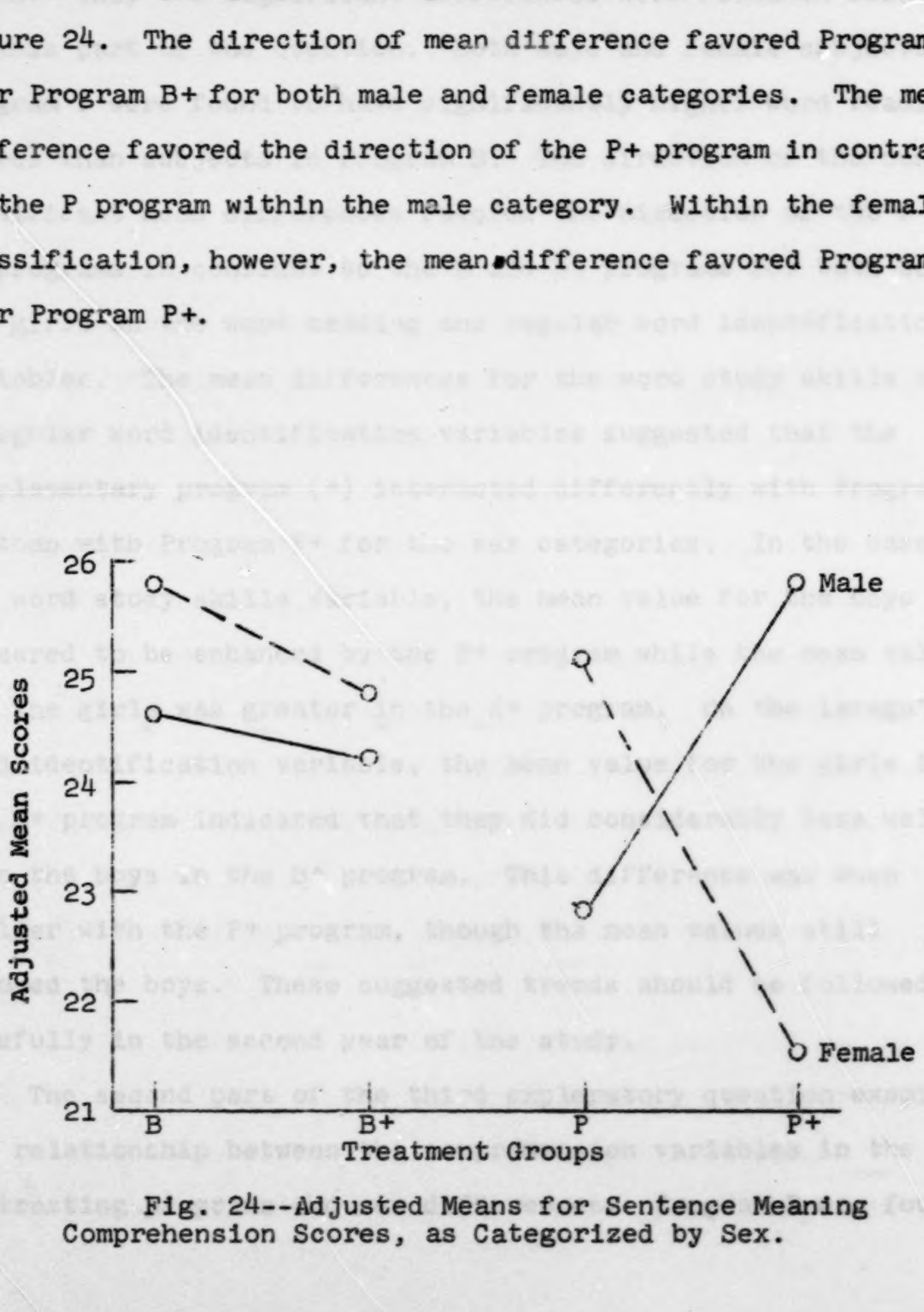

Fig. 24--Adjusted Means for Sentence Meaning Comprehension Scores, as Categorized by Sex.

Summary of the Third Set of Exploratory Findings

The initial part of the third exploratory question considered the relationship between sex differences and each of the four word recognition variables in contrasting reading programs. Only two significant differences were found in relation to this part of the question. Both male and female subjects in Program P were found to have significantly higher word reading scores than subjects in Program B. The direction of the non-significant mean differences favored the direction of the P and P+ programs in contrast to the B and B+ programs for both boys and girls on the word reading and regular word identification variables. The mean differences for the word study skills and irregular word identification variables suggested that the supplementary program (+) interacted differently with Program B+ than with Program P+ for the sex categories. In the case of the word study skills variable, the mean value for the boys appeared to be enhanced by the P+ program while the mean value for the girls was greater in the B+ program. On the irregular word identification variable, the mean value for the girls in the B+ program indicated that they did considerably less well than the boys in the B+ program. This difference was much smaller with the P+ program, though the mean values still favored the boys. These suggested trends should be followed carefully in the second year of the study.

The second part of the third exploratory question examined the relationship between the comprehension variables in the contrasting programs and sex differences. Program B was found to produce a significantly higher mean value than Program B+ for the paragraph meaning variable within the female category. This was the only significant difference found on the paragraph meaning and sentence meaning comprehension variables, even though the pattern of differences for both variables was identical for the programs and the sex categories. The nonsignificant mean values suggest that Program P and the supplementary aspect (+) of the P+ program interact differently with boys than with girls. The boys appeared to profit to a higher degree in paragraph and sentence meaning comprehension from the P+ program than girls while the reverse was true with the P program.

The findings related to the third exploratory question of the study include the following:

(1) Both male and female subjects in Program P were found to score significantly higher on the word reading variable than subjects in Program B.

(2) The consistent nonsignificant mean patterns for the word study skills and irregular word identification variables suggest that the supplementary program (+) interacted differently with Program B+ than with Program P+ for the sex variables.

(3) Program B was found to produce a significantly higher paragraph meaning mean score than Program B+ within the female category.

(4) The consistent nonsignificant mean patterns for the paragraph and sentence meaning variables suggest that Program P and the supplementary aspect (+) of the programs interact differently with boys than with girls. Boys appear to profit to a

higher degree in paragraph and sentence meaning comprehension from the P+ program while the utilization of the P program appears to enhance these scores for the girls. This suggested trend should be carefully followed in the second year of the study.

The Fourth Exploratory Question--Chronological Age

The fourth exploratory question of the study stated: Are there significant differences in (a) word recognition scores (B,P; B+,P+), and (b) reading comprehension scores (B,B+; P,P+), in the different reading programs among children of different chronological age? The chronological age data for the variables of word reading, word study skills, paragraph meaning comprehension, and sentence meaning comprehension were categorized on the basis of the following classification:

Category	Chronological Age Range in Months	Chronological Age Range in Years and Months
High	78 - 94	6.5 - 7.8
Mid	74 - 77	6.2 - 6.4
Low	60 - 73	5.0 - 6.1

Due to the small sample size, the regular word identification and irregular word identification were categorized in the following manner:

Category	Chronological Age Range in Months	Chronological Age Range in Years and Months
High	76 - 85	6.3 - 7.1
Low	70 - 75	5.8 - 6.2

The data relative to the word recognition variables as classified by the chronological age breakdown are presented in Table 15.

TABLE 15

ADJUSTED MEANS FOR WORD READING, WORD STUDY SKILLS, REGULAR WORD IDENTIFICATION, AND IRREGULAR WORD IDENTIFICATION FOR TREATMENT GROUPS B, P, B+, AND P+, AS CLASSIFIED BY CHRONOLOGICAL AGE

Chron. Age	Group B	Group P	Mean Diff.	Critical Diff.	Group B+	Group P+	Mean Diff.	Critical Diff.
WORD READING								
High	18.77 (N=40)	22.26* (N=47)	3.49	2.20	17.83 (N=43)	20.52* (N=24)	2.69	2.62
Mid	18.55 (N=34)	21.66* (N=36)	3.11	2.52	19.25 (N=32)	19.53 (N=30)	.28	2.62
Low	17.04 (N=35)	18.81 (N=24)	1.77	2.83	16.44 (N=49)	14.51 (N=17)	1.93	2.94
WORD STUDY SKILLS								
High	33.77 (N=40)	34.70 (N=47)	.93	3.02	32.82 (N=43)	35.56 (N=24)	2.74	3.60
Mid	34.45 (N=34)	34.90 (N=36)	.45	3.45	35.54 (N=32)	35.27 (N=30)	.27	3.60
Low	32.31 (N=35)	31.08 (N=24)	1.23	3.88	31.77 (N=49)	28.74 (N=17)	3.03	4.93
REGULAR WORD IDENTIFICATION								
High	7.33 (N=19)	9.71 (N=27)	2.38	3.28	5.28 (N=13)	8.57 (N=21)	3.29	3.83
Low	4.67 (N=25)	6.06 (N=14)	1.39	3.72	5.13 (N=26)	5.81 (N=15)	.68	3.50
IRREGULAR WORD IDENTIFICATION								
High	12.70 (N=19)	12.39 (N=27)	.31	3.42	11.88 (N=13)	10.98 (N=21)	.90	3.99
Low	10.11 (N=25)	8.67 (N=14)	1.44	3.78	12.17* (N=26)	8.29 (N=15)	3.88	3.65

*Contrast significant at the .05 level.

The means for the dependent variables on comprehension as categorized by chronological age levels are found in Table 16.

TABLE 16

ADJUSTED MEANS FOR PARAGRAPH MEANING COMPREHENSION AND SENTENCE MEANING COMPREHENSION FOR TREATMENT GROUPS B, B+, P, AND P+, AS CLASSIFIED BY CHRONOLOGICAL AGE

Chron. Age	Group B	Group B+	Mean Diff.	Critical Diff.	Group P	Group P+	Mean Diff.	Critical Diff.
PARAGRAPH MEANING								
High	18.53* (N=40)	15.37 (N=43)	3.16	3.15	16.85 (N=47)	17.99 (N=24)	1.14	3.58
Mid	18.88 (N=34)	17.55 (N=32)	1.32	3.15	16.78 (N=36)	17.48 (N=30)	.70	3.58
Low	16.89 (N=34)	14.11 (N=49)	2.78	3.15	13.29 (N=24)	11.56 (N=17)	1.73	4.63
SENTENCE MEANING								
High	27.44 (N=41)	25.18 (N=43)	2.26	5.32	26.67 (N=50)	26.98 (N=27)	.31	5.81
Mid	26.64 (N=33)	27.93 (N=36)	1.29	5.81	25.03 (N=38)	27.27 (N=32)	2.24	5.81
Low	21.89 (N=37)	21.64 (N=50)	.25	5.32	17.72 (N=24)	14.34 (N=21)	3.38	7.26

*Contrast significant at the .05 level.

Word Reading. The data presented in Table 15 and illustrated in Figure 25 reveal that three significant contrasts were present between the programs within the mid and high chronological age levels. Two of these contrasts favored the P program over the B program on mid and high chronological age levels. The third significant difference favored the P+ program in contrast to the B+ program within the high chronological age category.

The nonsignificant mean differences favored the P program over the B program for the low chronological age category. Although the mean difference was in the direction of the P+ program in contrast to the B+ program for mid chronological age level, the reverse was true for the low chronological age group.

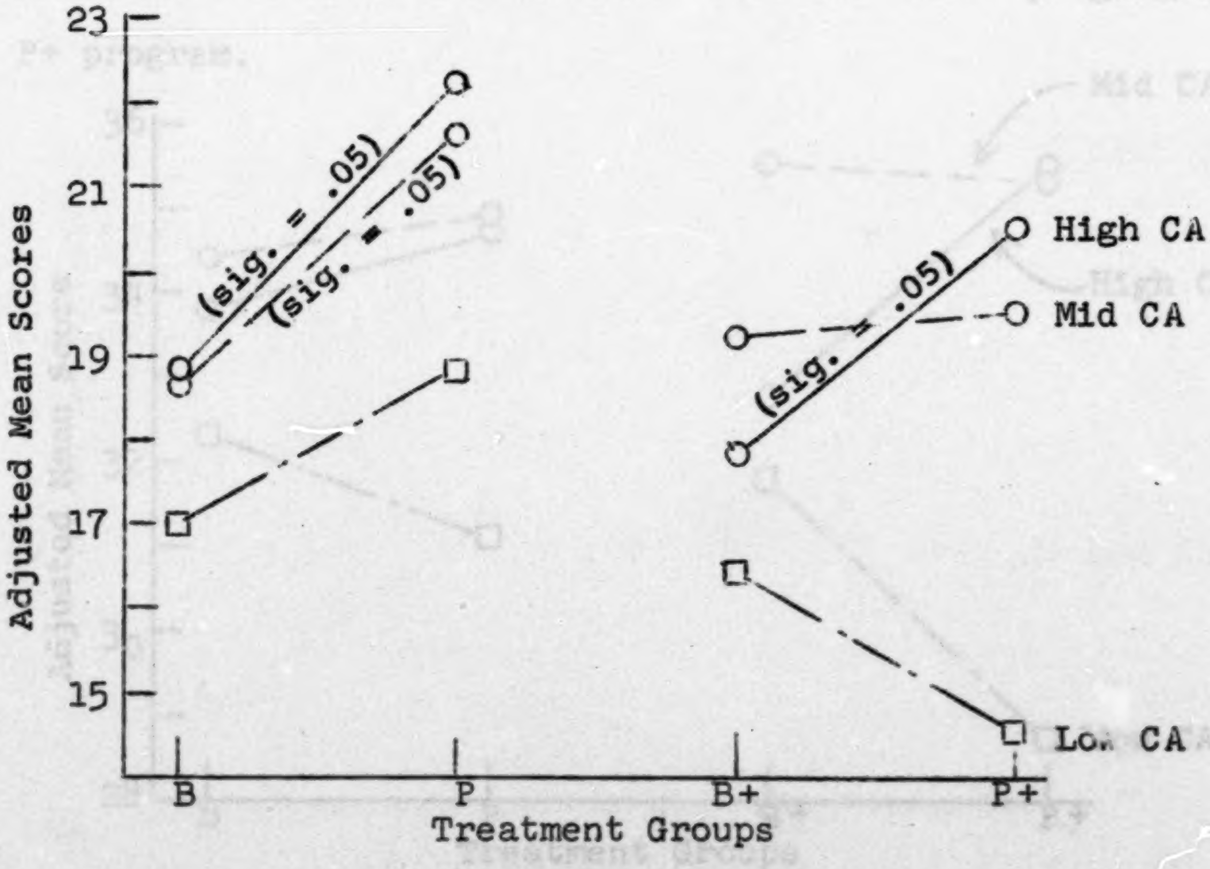

Fig. 25--Adjusted Means for the Word Reading Scores, as Categorized by Chronological Age.

Word Study Skills. No significant difference was found on any contrast within the chronological age levels on the word study skills variable. The data in Table 15, graphically illustrated in Figure 26, indicate that the nonsignificant mean differences favored Program P in contrast to Program B on the mid and high chronological age levels. The reverse was true for the low category. Program P+ was favored over Program B+ for the high chronological age level; however, Program B+ was favored on the mid and low categories. These data suggest that the low chronological age groups seem to profit to a greater extent on the word study skills variable from the B and B+ programs than from the P and P+ programs. The reverse would seem to be true for the mid and high chronological age groups, excepting the contrast for the mid level on the B+ program and the P+ program.

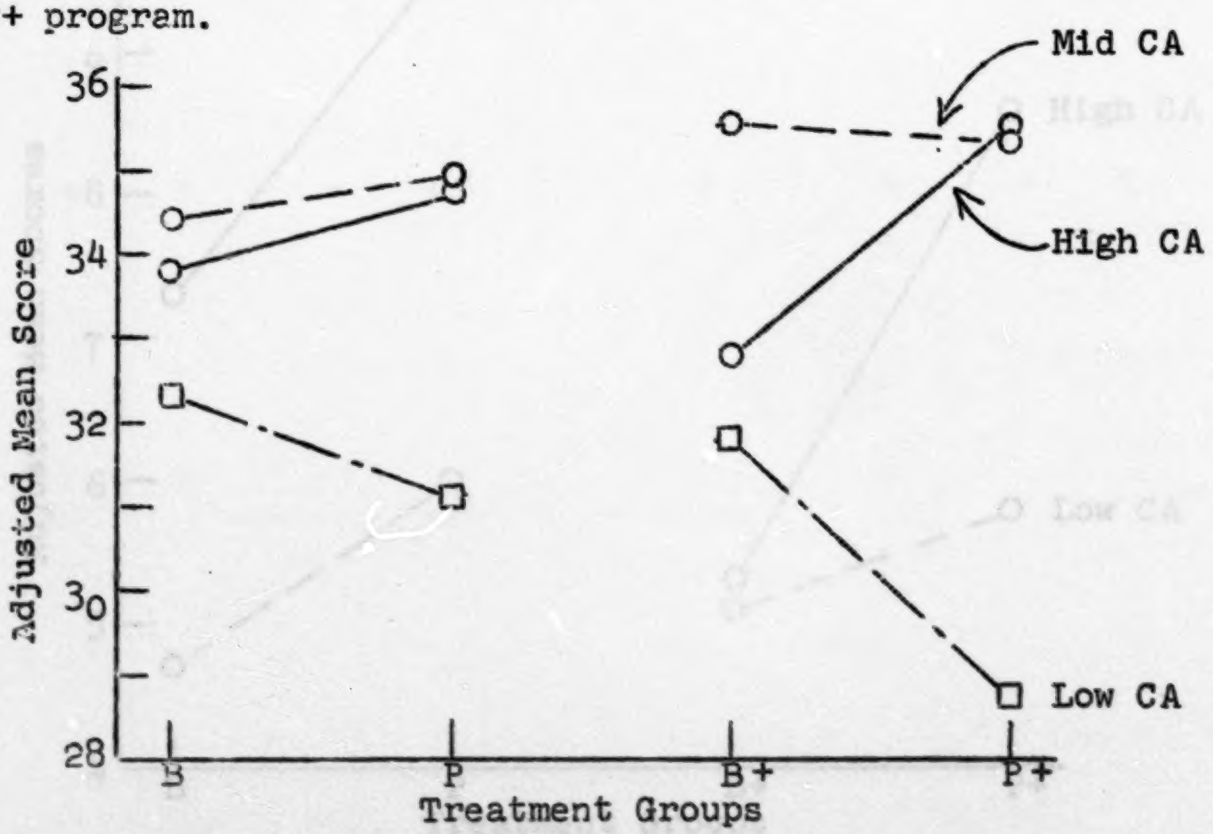

Fig. 26--Adjusted Means for the Word Study Skills Scores, as Categorized by Chronological Age.

Regular Word Identification. As indicated in Table 15 and Figure 27, no significant difference was found on any contrast between the reading programs within the high and the low chronological age breakdown. The consistent nonsignificant mean differences, however, suggest a trend favoring Programs P and P+ in contrast to Programs B and B+ on both high and low chronological age levels. This suggested trend will be carefully followed in the second year of the study.

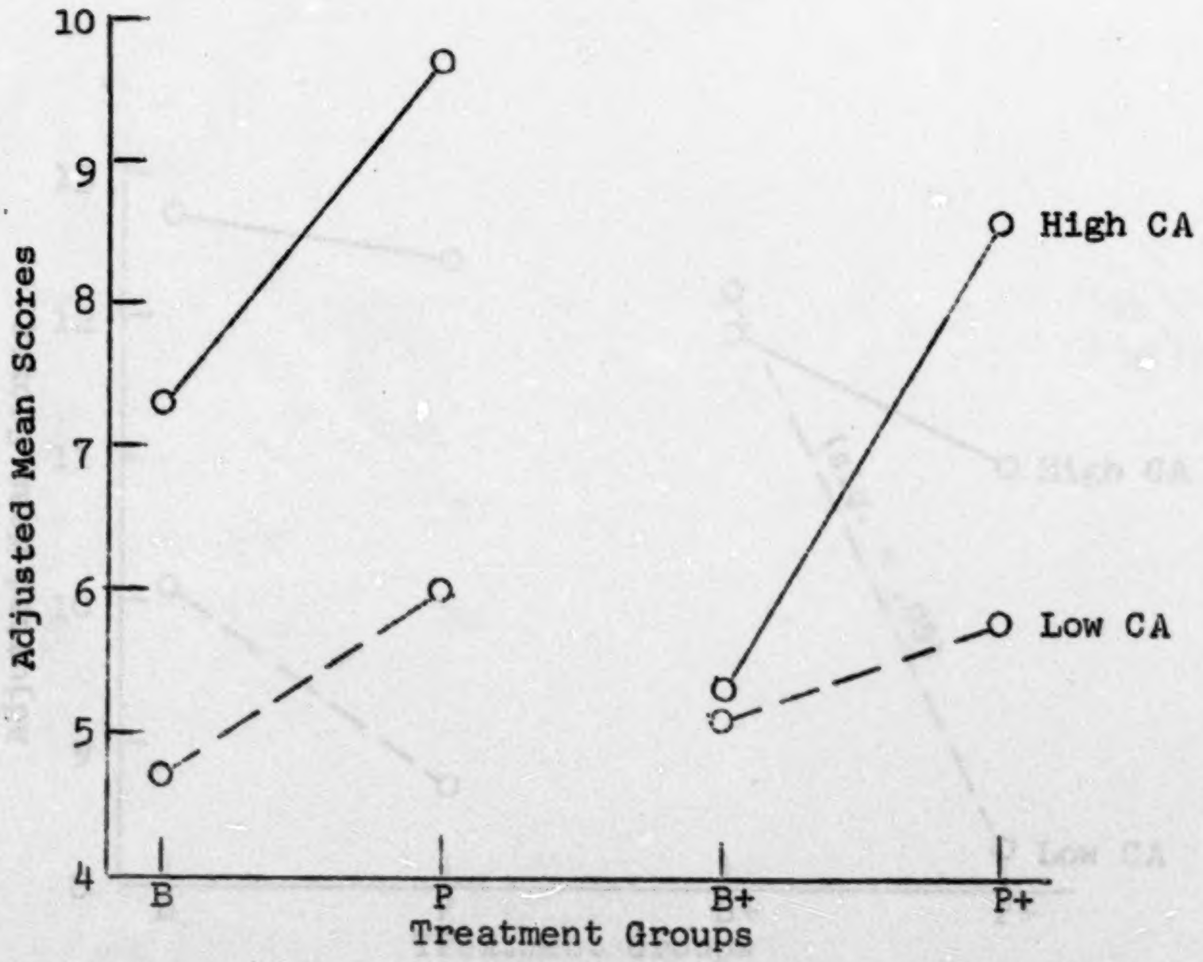

Fig. 27--Adjusted Means for the Regular Word Identification Scores, as Categorized by Chronological Age.

Irregular Word Identification. As indicated in Table 15 and graphically shown in Figure 28, one significant difference was found on the word identification variable favoring Program B+ over Program P+ within the low chronological age level. No other mean differences were of sufficient magnitude to reach significance. The nonsignificant mean values, however, consistently favored Programs B and B+ in contrast to Programs P and P+ respectively. These findings suggest that on the irregular word identification variable, the supplementary program (+) interacted differently with the B+ program than with the P+ program, favoring the B+ program.

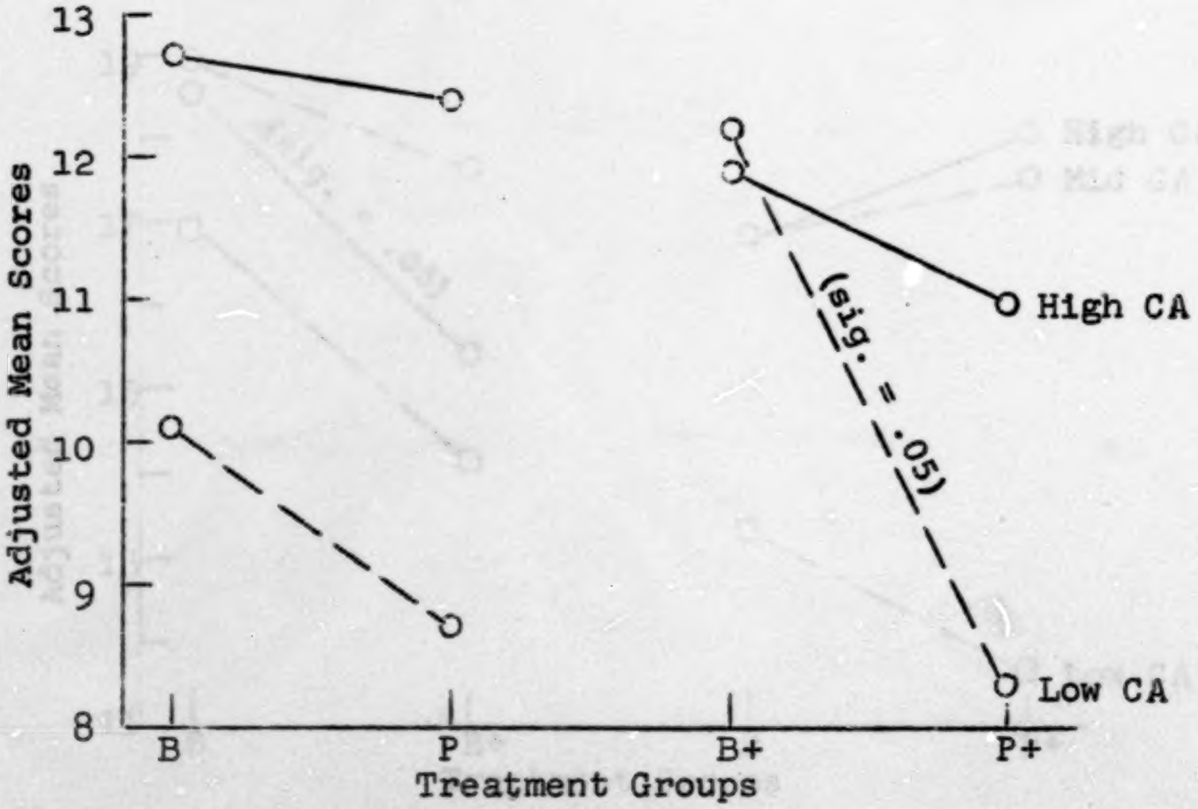

Fig. 28--Adjusted Means for the Irregular Word Identification Scores, as Categorized by Chronological Age.

Paragraph Meaning. Only one significant difference was found to be present on the program contrasts within the chronological age breakdown. As indicated in Table 16 and Figure 29, this significant contrast favored Program B over Program B+ on the high chronological age level. The nonsignificant mean differences also favored Program B in contrast to Program B+ on the mid and low chronological age levels. Program P+ produced higher mean values than Program P for the mid and high chronological age groups. The reverse was true for the low chronological age group. These findings suggest that the supplementary program (+) interacted differently with Program P+ than with Program B+ on the paragraph meaning variable within the mid and high chronological age levels.

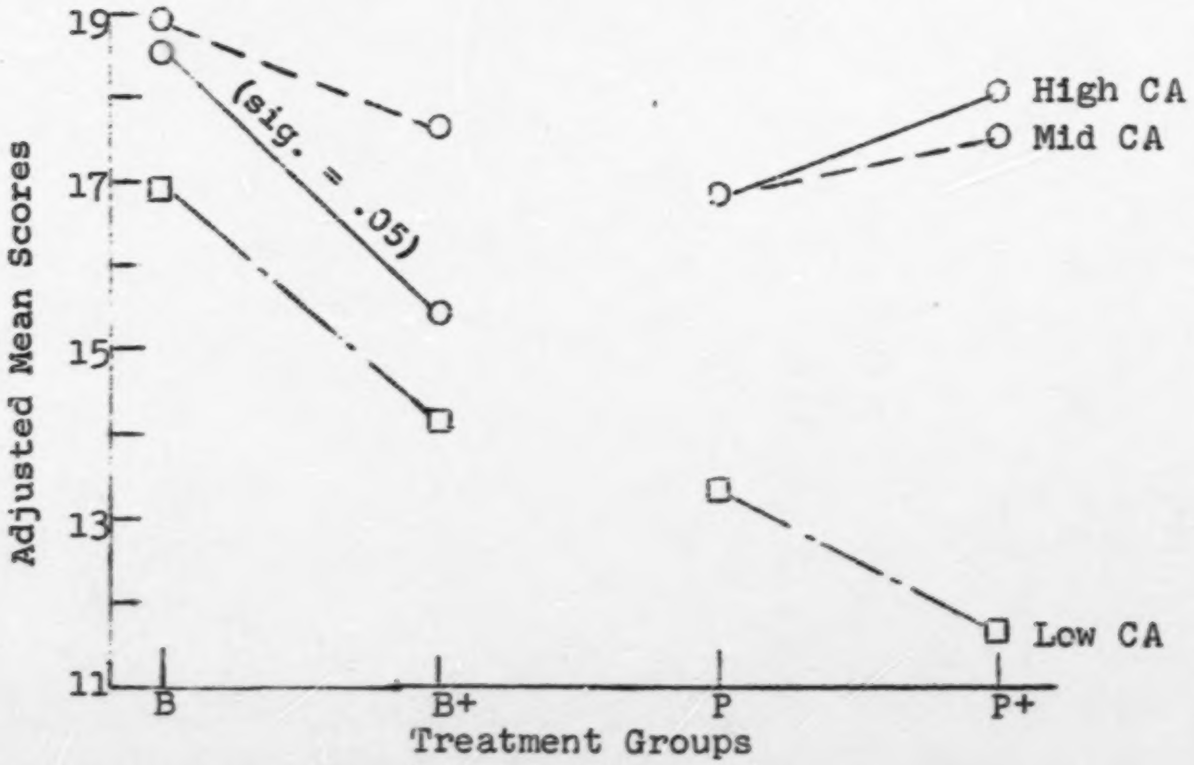

Fig. 29--Adjusted Means for the Paragraph Meaning Comprehension Scores, as Categorized by Chronological Age.

Sentence Meaning. The data presented in Table 16 and graphically illustrated in Figure 30 reveal that no significant difference was found between any mean contrasts on the sentence meaning variable within the chronological age levels. The nonsignificant mean differences were found to favor the P+ program in contrast to the P program on the high and mid chronological age levels, whereas the reverse was true for the low level. Although the mean difference favored the direction of the B+ program over the B program on the mid chronological age level, the B program was favored in the high and low age classification. These data suggest that the supplementary program (+) interacts differently with the P+ program than with the B+ program within the high and low chronological age classifications.

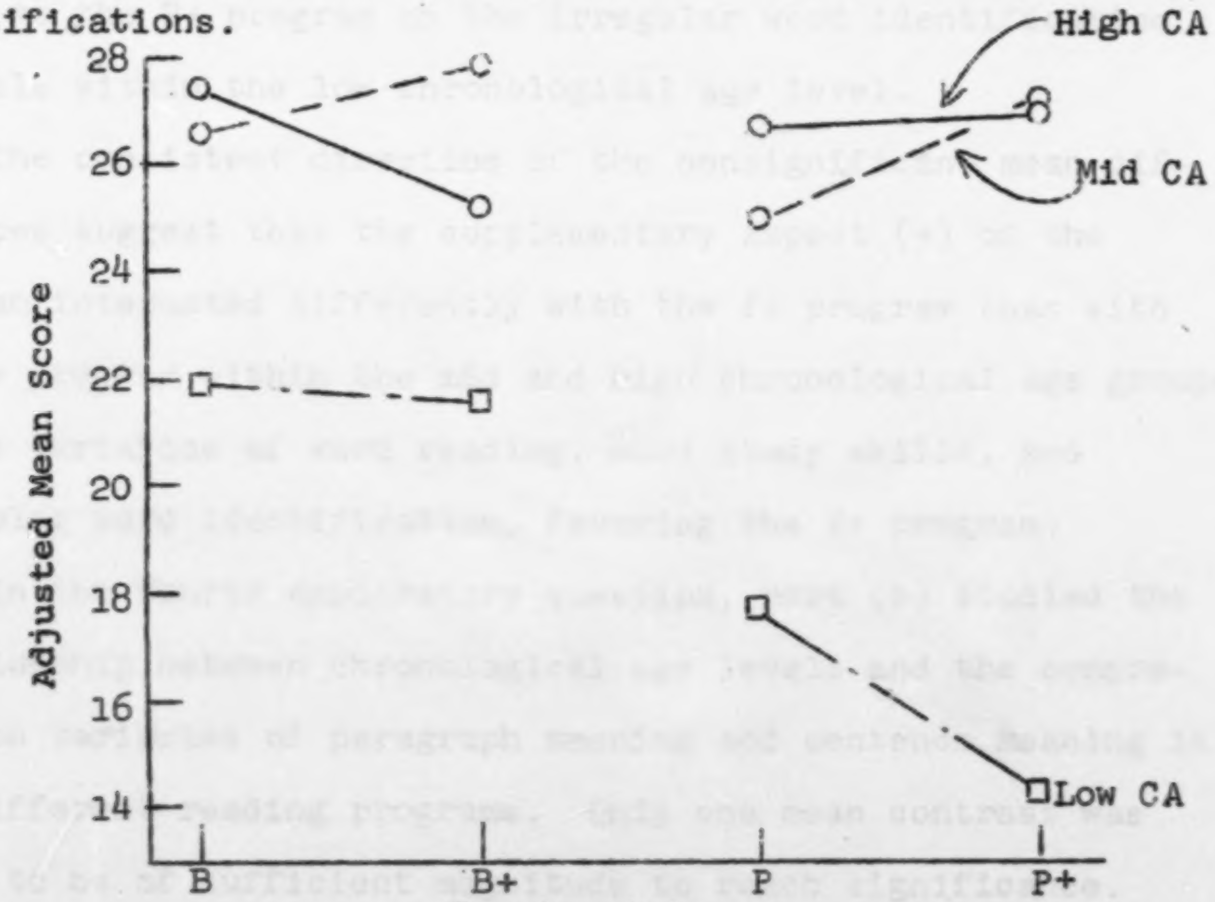

Fig. 30--Adjusted Means for the Sentence Meaning Comprehension Scores, as Categorized by Chronological Age.

Summary of the Fourth Set of Exploratory Findings

Part (a) of the fourth exploratory question examined the relationship between chronological age differences and each of the four word recognition variables in the different reading programs. Four mean contrasts were reread for "contrast is significant" and "means differ significantly." Three of these contrasts were significant on the word reading variable. The mean values for the P program for the mid and high chronological age levels were found to be significantly higher than the mean values for Program B. Program P+ also produced a significantly higher mean value than Program B+ on the word reading variable within the high chronological age range. The fourth significant mean contrast favored the direction of the B+ program in contrast to the P+ program on the irregular word identification variable within the low chronological age level.

The consistent direction of the nonsignificant mean differences suggest that the supplementary aspect (+) of the program interacted differently with the P+ program than with the B+ program within the mid and high chronological age groups on the variables of word reading, word study skills, and irregular word identification, favoring the P+ program.

In the fourth exploratory question, part (b) studied the relationship between chronological age levels and the comprehension variables of paragraph meaning and sentence meaning in the different reading programs. Only one mean contrast was found to be of sufficient magnitude to reach significance. This contrast in relation to the paragraph meaning variable favored the B program over the B+ program within the high chronological age level. The consistent pattern of nonsignificant mean differences suggested that the supplementary aspect (+) of the program interacted differently with Program P+ than with Program B+ and favored the P+ program on the mid and high chronological age levels.

The findings relative to the fourth exploratory question include the following:

(1) Program P resulted in significantly higher word reading mean values than did Program B for the mid and high chronological age levels.

(2) The mean value for Program P+ was significantly higher than the mean value for Program B+ on the word reading variable within the high chronological age range.

(3) The consistent pattern of nonsignificant mean differences suggests that the supplementary aspect (+) of the program interacted differently with the P+ program than with the B+ program within the mid and high chronological age groups on the word reading, word study skills, and irregular word identification variables, favoring the P+ program.

(4) Program B was found to produce a significantly higher paragraph meaning mean value than Program B+ within the high chronological age level.

(5) Within the mid and high chronological age levels, the supplementary aspect (+) of the program appeared to interact differently with Program P+ than with Program B+, favoring the

P+ program, as indicated by the consistent pattern of nonsignificant mean differences on the paragraph and sentence meaning comprhension variables.

CHAPTER V

SUMMARY AND CONCLUSIONS

Purpose of the Study

The primary objective of the study was to investigate the effect on word recognition and reading comprehension skills of four reading programs varying in (a) the degree of regularity of grapheme-phoneme correspondences programmed into the vocabulary presented, and (b) the emphasis on language structure as related to meaning. The secondary objective of the investigation was to study the relationship between the morphological and syntactical language development of first grade children at the beginning of grade one and their reading comprehension and vocabulary achievement at the end of the first grade.

Four exploratory questions were developed to study the relationship between the independent background variables of mental age, socioeconomic status, sex, and chronological age and the dependent variables of word recognition and reading comprehension and any changes in these relationships according to the contrastingly different reading programs employed.

Methodology and Research Design

Two published reading programs were selected and two supplementary reading programs were developed to encompass the specific characteristics necessary for the experimental testing of the hypotheses. Reading Program B, a basal reader, was one of two basal programs available for use in the Oakland Unified

School District. This program made little attempt to control the grapheme-phoneme regularities in the vocabulary presented. Workbooks were provided for this program by the research project. This basal reader series was selected for use in Program B and Program B^+ because it had not been previously utilized by the teachers in the investigation. Reading Program P, a basal reading program offering controlled and programmed regularities of grapheme-phoneme correspondences presented in the vocabulary,was provided by the research project. The supplementary aspects of Programs B^+ and P+, emphasizing language structure as related to meaning, were developed by the investigator. It was thus insured that all reading programs were used for the first time by the teachers participating in the study.

Twenty-four first grade classrooms in the Oakland Unified School District, Oakland, California, were selected for the study to represent a wide range of socioeconomic levels. As indicated by the 1960 census report, eight of the classrooms were located in the lowest income areas of the school district, and eight in the highest income areas of the district. The remaining eight classrooms represented the middle income range. The teachers representing classrooms on each income level were randomly assigned to each of the four treatment groups (Programs B, P, B+, and P+).

A two and one-half day workshop was held at the beginning of the school year for the teachers in each treatment group. Each of the four reading programs was studied in depth with each of the four teacher groups representing the varied treatments. Five teacher workshops were held for all treatment groups during the year. Provision for equal visitation and workshop time for teachers in all treatment groups was carefully controlled throughout the investigation. The above considerations and controls were believed essential in making provision for generating equivalent teacher interest and thus controlling for differences which might have been produced by the "Hawthorne effect."

The time devoted to the reading instruction period was held constant for each of the four treatment groups. The first group of subjects in Program B and in Program P devoted 60 minutes in the morning to reading; the second group of subjects in each program devoted 60 minutes in the afternoon to the same activity. Both programs thus used the split-group plan[1] common to the school district. The first group of subjects in Program B+ and Program P+ likewise utilized the split-group plan and devoted 45 minutes to basal reading in the morning while the second group devoted 45 minutes in the afternoon to the basal reading programs common respectively to Program B and Program P. The remaining 15 minutes in the morning and afternoon groups for subjects in Program B+ and Program P+ were utilized for the supplementary program emphasizing language structure as related to meaning.

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[1] Under the split-group reading plan the first group of pupils in the reading class arrives at 8:45 A.M., and reading is taught until 9:45 A.M. At 9:45 A.M. the second group of pupils joins the class. At 2:00 P.M. the pupils who came to school at 8:45 A.M. leave the class, and the pupils who entered school at 9:45 A.M. have reading class from 2:00 P.M. until 3:00 P.M.

During September of the 1964 school year the following tests were administered to all subjects: Metropolitan Readiness Test, Form A; Murphy-Durrell Diagnostic Reading Readiness Test; Thurstone Pattern Copying and Identical Forms Test; and the Pintner-Cunningham Primary Test of General Ability, Form A. Modified forms of Berko's Test of Morphology and Fraser, Bellugi, and Brown's Test of Syntax were administered individually to 160 randomly selected children (40 subjects from each treatment group). The latter two tests were used in measuring the subjects' control over specific aspects of their morphological and syntactical language systems.

In May of 1965 a battery of criterion tests was administered to evaluate reading achievement relative to the hypotheses of the study. These included the following: the Word Reading, Word Study Skills, Paragraph Meaning, and Vocabulary subtests of the Stanford Achievement Test; the Primary Test of Syntax designed by the investigator to measure sentence meaning; the Phonetically Regular Words Oral Reading Test designed by the University of Minnesota Coordinating Research Center to measure regular word identification; and the Gates Word Pronunciation Test to measure the variable of irregular word identification.

The analysis of covariance was used in testing the hypotheses related to the primary objective of the study. The covariate for each criterion variable consisted of the readiness variable which correlated most highly with the dependent variable under consideration. If significant effects were found on the F test, then individual comparisons of the means were made by using the t test. The Pearson product-moment correlation was used in testing the hypothesis exploring the secondary objective of the study. The desired contrasts relative to the four exploratory questions of the study were examined by using the Scheffé technique of contrasted means.

Findings, Discussion, and Recommended Research

The following findings and discussion are based on the data from the first nine months of the first grade experimental study.

First Hypothesis: Part One. The first grade reading programs possessing a high degree of consistency in grapheme-phoneme correspondences in the vocabulary introduced (Program P, Program P+) produced significantly higher (a) word reading, (b) word study skills, and (c) regular word identification scores than the reading programs making little provision for consistent correspondences (Program B, Program B+), with one exception. This exception resulted from a nonsignificant difference between the mean values for Program B and Program P on the word study skills variable. Although the mean difference was in the predicted direction, it was not of sufficient magnitude to reach significance.

A significant interaction was found between the basal programs (B,P) and the supplementary programs (B+,P+) on the word study skills and regular word identification variables. This interaction suggests that the language structure supplement (+) interacted differently with the P+ program than with the B+ program, favoring Program P+. This interaction was interpreted to have resulted from the highly regular correspondences used in the supplementary aspect (+) of the P+ program by providing additional reinforcement for the subjects in the use of regular correspondences leading to superior decoding ability. Findings in the second year of the study should be carefully observed for evidence supporting or rejecting this interpretation. The exact nature of this interaction should be pursued in future research.

First Hypothesis: Part Two. The first grade reading program making little provision for consistent correspondences (Program B) did not produce significantly higher irregular word identification achievement scores than the program placing emphasis on consistent correspondences (Program P). The program making provision for a high degree of consistency in grapheme-phoneme correspondences in the vocabulary introduced and placing special emphasis on language structure as related to meaning (Program P+) produced significantly higher irregular word identification achievement scores than the reading program making little provision for consistent correspondences and placing special emphasis on language structure as related to meaning (Program B+). The latter part of this conclusion is the inverse of the predicted finding expressed in the original experimental hypothesis.

Second Hypothesis. The first grade reading program making provision for a high degree of consistency in grapheme-phoneme correspondences and placing special emphasis on language structure as related to meaning (Program P+) produced significantly higher (a) paragraph meaning comprehension, and (b) sentence meaning comprehension scores than the program making provision for a high degree of consistency in correspondences and placing no special emphasis on language structure as related to meaning (Program P). The program making little provision for consistent correspondences and placing special emphasis on language structure as related to meaning (Program B+) did not result in significantly higher (a) paragraph meaning comprehension, and (b) sentence meaning comprehension scores than the program making provision for a high degree of consistency in correspondences and placing no special emphasis on language structure as related to meaning (Program P). The program making little provision for consistent correspondences and placing special emphasis on language structure as related to meaning (Program B+) did not result in significantly higher (a) paragraph meaning comprehension, and (b) sentence meaning comprehension scores than the program making little provision for consistent correspondences and placing no special emphasis on language structure as related to meaning (Program B). In the latter finding a significant difference was found between Program B and Program P favoring the direction of Program B.

The basal reading programs (B,P) and the supplementary programs (B+,P+) were found to interact significantly. The data were interpreted to suggest that the language structure supplement (+) interacted more favorably with the P+ program than with the B^{+} program on both comprehension variables. It is possible that this interaction could have been produced by

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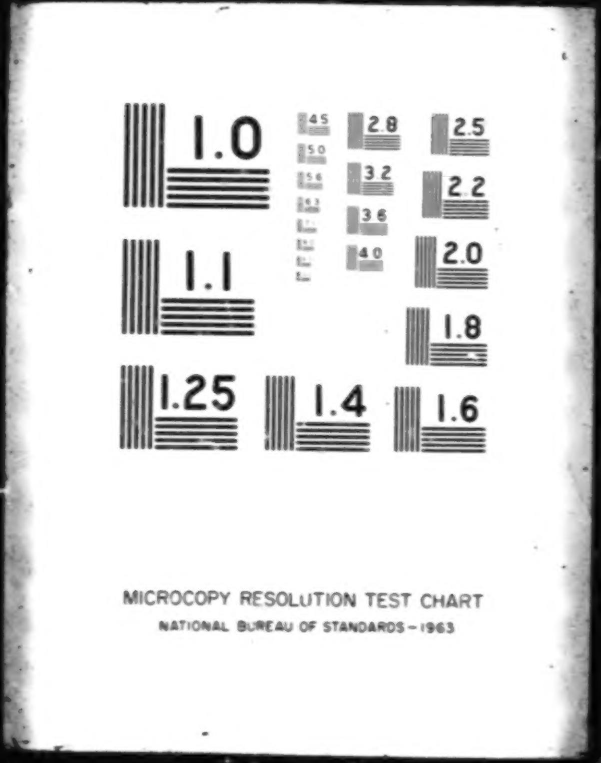
1.0
4.5
2.8
2.5
5.0
3.2
2.2
5.6
6.3
3.6
4.0
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1.8
1.25
1.4
1.6

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963

the additional reinforcement of consistent correspondences characteristic of the vocabulary used in the language structure supplement (+) of the P+ program. Should this have been the case, as is suggested in part one of the first hypothesis, the subjects in the P+ program could then have mobilized the comprehension skills developed to perform significantly better on the paragraph and sentence meaning comprehension tasks. Findings in the second year of the study should be carefully considered for evidence which will support or reject this interpretation.

Third Hypothesis. Paragraph meaning comprehension, sentence meaning comprehension, and vocabulary achievement of first grade subjects at the end of grade one are a function of the control which the subjects exhibit over designated aspects of (a) their morphological language system, and (b) their syntactical language system at the beginning of grade one. A more complete understanding of the nature of these relationships will require additional research exploration.

The following discussion and summary are based upon the findings of the first grade study in relation to the four exploratory questions.

First Exploratory Question: Mental Age. Program P and Program P+ produced significantly higher (a) word reading, (b) word study skills, and (c) regular word identification scores than Program B and Program B+ on all mental age levels with the exception of four contrasts. The mean values for the three independent word recognition variables were not found to differ significantly between Program B+ and Program P+ within the low mental age category. Program P did not differ significantly from Program B on the word study skills mean values within any mental age level.

On the paragraph meaning comprehension variable, Program B was found to produce significantly higher mean values than Program B+ within the mid mental age category. Program P+, however, produced significantly higher sentence meaning comprehension scores than Program P within the high mental age category. The consistent direction of the nonsignificant mean differences on the paragraph meaning and sentence meaning comprehension variables suggests that the supplementary aspect (+) of the programs interacted differently with Program P+ than with Program B+, favoring the P+ program for subjects in the mid and high mental age categories. This finding also receives support from the conclusion related to the second hypothesis of the study.

Second Exploratory Question: Socioeconomic Status. Program P and Program P+ produced significantly higher word reading mean scores than Program B and Program B+ respectively for the subjects categorized in the high socioeconomic status level. Program P+ was found to produce significantly higher regular word identification scores than Program P for subjects in the high and low socioeconomic status categories.

On the paragraph meaning comprehension variable, Program B produced a significantly higher mean value than Program B+ within the low socioeconomic category. Program P+ produced a significantly higher sentence meaning comprehension mean value than Program P within the high socioeconomic classification.

The supplementary aspect (+) of the programs again appeared to have interacted differently with Program P+ than with

Program B+, favoring the P+ program, for subjects in the mid and high socioeconomic levels on both the paragraph and the sentence meaning comprehension variables. This interaction should be further explored in future research.

Third Exploratory Question: Sex. On the word reading variable, Program P produced significantly higher mean values than Program B for both boys and girls.

Program B produced a significantly higher paragraph meaning comprehension score than Program B+ within the female category. The consistent nonsignificant mean patterns for the paragraph and sentence meaning variables suggest that Program P and the supplementary aspect (+) of Program P+ interacted differently with boys than with girls. Boys appeared to profit to a higher degree on the paragraph and sentence meaning comprehension variables in the P+ treatment group while the utilization of Program P appeared to be of greater value to the girls. This suggested trend should be carefully followed in the second year of the study.

Fourth Exploratory Question: Chronological Age. Program P produced significantly higher word reading mean values than did Program B for the mid and high chronological age levels. The mean value produced by Program P+ was significantly higher than the mean value for Program B+ on the word reading variable within the high chronological age range.

Within the mid and high chronological age categories the consistent pattern of nonsignificant mean differences favored the direction of Programs P and P+, in contrast to Programs B and B+ respectively on the variables of word reading, word study skills, and irregular word identification.

On the paragraph meaning comprehension variable, Program B produced a significantly higher mean value than Program B+ within the high chronological age level. Within the mid and high chronological age categories, the supplementary aspect (+) of the programs appeared to interact differently with Program P+ than with Program B+, favoring Program P+. This is indicated by the consistent pattern of nonsignificant mean differences on the paragraph and sentence meaning comprehension variables.

Findings in the second year of the study should be carefully examined for evidence which will support or reject these suggested trends.

Conclusions

Within the limits of the investigation, the following conclusions based upon the findings of the study would seem to be warranted.

1. It was concluded, in regard to part one of the first hypothesis, that the first grade reading programs possessing a high degree of consistency in grapheme-phoneme correspondences produced significantly higher (a) word reading, (b) word study skills, and (c) regular word identification achievement than the reading programs making little provision for consistent correspondences, with the exception of one contrast on the word study skills variable.

2. In regard to part two of the first hypothesis, it was concluded that the reading program making little provision for consistent correspondences did not produce significantly higher irregular word identification achievement than the reading program possessing a high degree of consistency in correspondences. However, the reading program which provided for a high degree of consistency and also placed emphasis on language structure as related to meaning produced significantly higher irregular word identification achievement than the reading program which placed no emphasis on consistent correspondences but emphasized language structure as related to meaning.

3. In relation to the second hypothesis, it was concluded that the reading program possessing consistent correspondences and emphasizing language structure as related to meaning produced significantly higher (a) paragraph meaning comprehension, and (b) sentence meaning comprehension achievement than the program possessing only consistent correspondences. However, the program which did not control consistent correspondences but did emphasize language structure as related to meaning failed to produce significantly higher achievement on either of the comprehension variables than the reading program containing inconsistent correspondences.

4. In relation to the third hypothesis, it was concluded that paragraph meaning comprehension, sentence meaning comprehension, and vocabulary achievement of the first grade subjects at the end of grade one are a function of the control which the subjects exhibit over designated aspects of (a) their

morphological language system, and (b) their syntactical language system at the beginning of grade one.

The following general statements relative to the four exploratory questions should be considered only suggestive in nature. The smaller number of subjects within the two- or three-category classifications of mental age, socioeconomic status, sex, and chronological age greatly reduced the power of the tests of significance on the dependent variable contrasts. As a result, comparatively large differences were required for a mean difference to reach the level of significance. Thus suggested trends resulting from consistent nonsignificant mean differences have also been included in the statements below. Data collected in the second year of the study should be carefully examined for findings which substantiate or reject these trend statements.

1. The significant mean differences and the consistent nonsignificant mean trends suggest that the reading programs which possessed a high degree of consistency in correspondences benefited the children of both sexes and those classified in the mid and high categories of mental age, socioeconomic status, and chronological age on (a) word reading, (b) word study skills, and (c) regular word identification achievement to a greater degree than the reading programs which possessed little control over consistent correspondences.

2. The programs possessing a high degree of consistency in correspondences also produced higher significant and consistent nonsignificant mean values on variables of (a) word reading,

and (b) regular word identification for the children classified in the low category of mental age, socioeconomic status, and chronological age than the programs which placed no special emphasis on controlled correspondences. However, the latter program produced significant and consistent (but nonsignificant) mean differences on the variables of word study skills and the irregular word identification, favoring the children in the low mental age, socioeconomic, and chronological categories.

3. The significant differences and consistent nonsignificant mean trends suggest that the reading program which possessed a high degree of consistency in correspondences, and also placed special emphasis on language structure, was of greater value to children in the male category and those in the mid and high categories of mental age, socioeconomic status, and chronological age on the variables of (a) paragraph meaning, and (b) sentence meaning comprehension achievement than the reading program which possessed only a high degree of consistency in correspondences. Mean values on both comprehension variables, however, were found to be of greater magnitude for children in the latter program if they were in the female category or classified in the low categories of mental age, socioeconomic status, and chronological age.

4. The reading program which possessed little control over consistent correspondences produced significantly higher and consistently higher (but nonsignificant) mean values on the variables of (a) paragraph meaning, and (b) sentence meaning comprehension for the children in all mental age,

socioeconomic, sex, and chronological age categories than the program which possessed little control over consistent correspondences but placed special emphasis on language structure as related to meaning, with one exception. This nonsignificant mean difference favored the direction of the latter program on the mid chronological age category.

Concluding Statement

This investigation represents an attempt to provide increased insight into basic factors in programs of early reading instruction and related language variables of children which may contribute to the improvement of reading achievement. The data which will be collected during the second year of the investigation should provide additional information which will allow the investigator to support or reject the experimental hypotheses and suggested trends with great certainty.

The need for carefully designed longitudinal reading research studies is of great importance if recently developed programs encompassing varied linguistic and psychological rationale are to be adequately evaluated in realistic classroom settings. The recognition of this requisite in research design, which a small minority of reading research studies has achieved should establish a base which will provide researchers with a more penetrating understanding of factors affecting language skill development.

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APPENDIX A

Primary Test of Syntax for (1) B and B+ Treatments and (2) P and P+ Treatments--Criterion Measure for Sentence Meaning Comprehension Variable

Primary Test of Syntax

Teacher Directions

PRIMARY TEST OF SYNTAX

NOTE: Before administering the test write each child's name in the appropriate space on the individual test.

A. Turn back the first page, containing the child's name, so that the sample item containing the first pictures is showing. Say: "Let's read the sentences that are next to the first two pictures."

"The kitten"

"The fish"

"A can"

"A big can"

Say: "Now look at the two pictures at the top of the page. The first picture is a kitten. The next picture is a fish. Draw a line from the first picture to the circle after the words that tell about the first picture." (Demonstrate with your copy.) (Check work to be sure children understand the task.)

B. Now read the second item to the children. Say:

1. "The big kitten"
2. "It ran fast"
3. "A fast fish"
4. "It went up"

Say: "Look at the two pictures in the middle of the page. The top picture is the big kitten. The next picture is a fast fish." Then say: "Draw a line from the top picture to the circle after the words that tell about the top picture. Then draw a line from the next picture to the circle after the words that tell about that picture." (Again demonstrate with your copy and check the children's work to make certain they understand the task) Say: "You see we have no pictures for two of the sentences."

C. For the third example item say: "This time I want you to draw the lines by yourself. Draw a line from each picture to the circle after the words that tell about the picture." After all the children have completed the item check their responses. Next read the item to the entire group.

Say: "Now let's do it all together."

"The fast kitten is black." "A can ran to the kitten."

"The kitten went in the can." "The kitten ran to a can."

Continue: "Look at the two pictures at the bottom of the page. The top picture shows that the kitten went in the can. The next picture shows that the kitten ran to a can. So, you should have drawn a line from the first picture to the circle next to the words: "The kitten went in the can" because these words tell about that picture. (Demonstrate with your own copy) For the second picture you should have drawn a line from the picture to the words: "The kitten ran to a can " because those words tell about that picture. (Demonstrate again with your own copy) Say: "Do you all understand what you are to do? Are there any questions? Turn the page and draw a line from each picture to the sentence that tells about it. Be sure to do every page in your booklet. Do not skip any parts and after you finish with one page, turn it and do the next page until you have finished the test. You may start now."

Note to Teacher: This test should be completed in approximately 25 to 30 minutes. You should find that your faster children will finish in 15 to 20 minutes. Plan to have seat work exercises ready for these children providing they finish early. Should your slower children need more than 25 or 30 minutes, extend the time factor by 10 minutes. This should not be a speed test. On the other hand, if a child has not completed the test within 30 to 40 minutes, he is undoubtedly having extreme difficulty on all items and the testing should be concluded. Please note the number of minutes in which your fastest children completed the test and the number of minutes taken by the slower children in completing the test. Record this time on this page of instructions.

Time for fast children: Started: Completed:

Time for slow children: Started: Completed:

Primary Test of Syntax
for P and P+ Treatments

PRIMARY TEST OF SYNTAX

P and P+ Treatments

Robert B. Ruddell
Asst. Professor of Education
University of California

CHILD'S NAME____

BIRTH DATE____

TEACHER____

SCHOOL____

DATE____

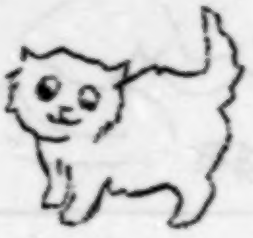
1.

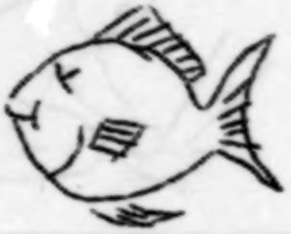
The kitten. ○

The fish. ○

A can. ○

A big can. ○





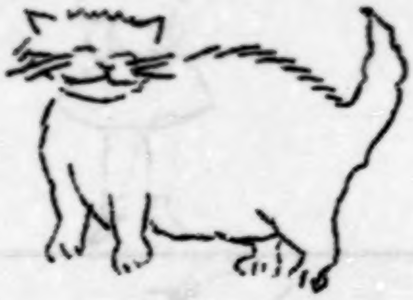
2.

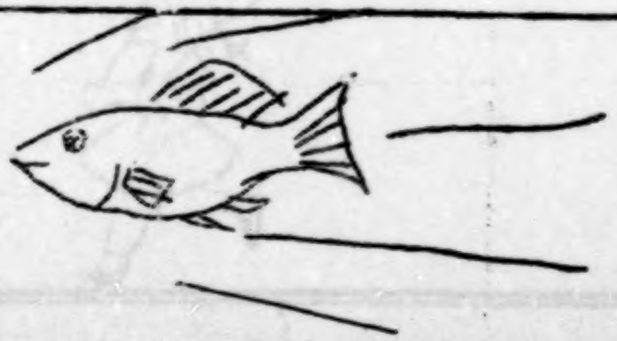
The big kitten. ○

It ran fast. ○

A fast fish. ○

It went up. ○





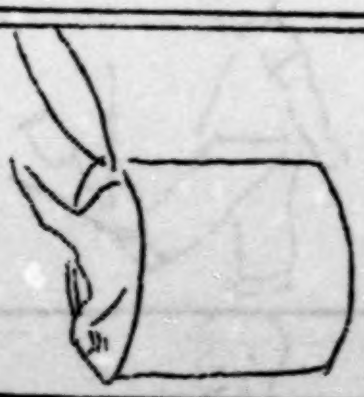
3.

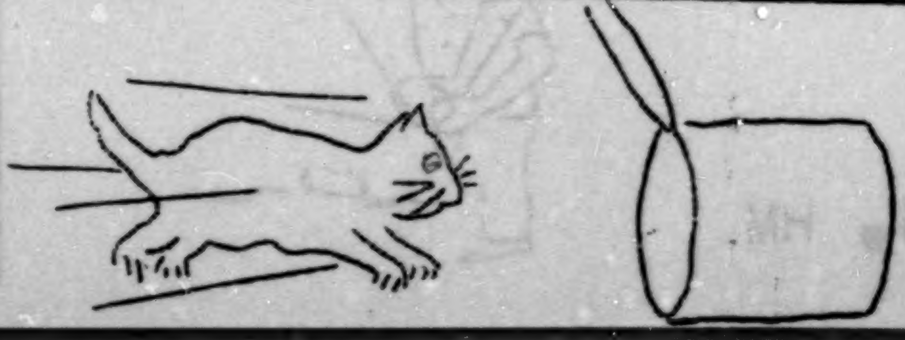
The fast kitten is black. ○

The kitten went in the can. ○

A can ran to the kitten. ○

The kitten ran to a can. ○





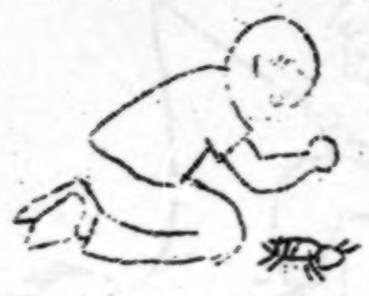
1.

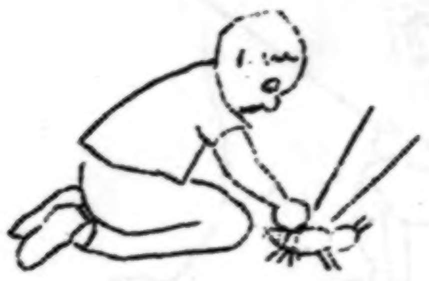
Sam will hit. ○

Sam catches Nip. ○

Sam is hitting. ○

Sam fills the glass. ○





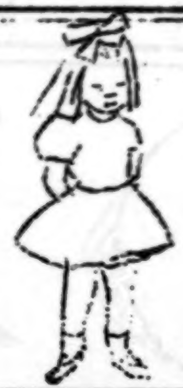
2.

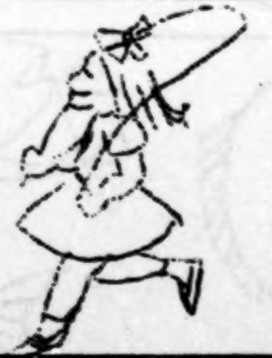
Ann is skipping. ○

Ann trips Sam. ○

Ann is not skipping. ○

Ann rips a dress. ○





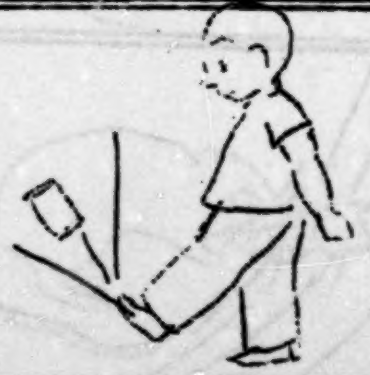
3.

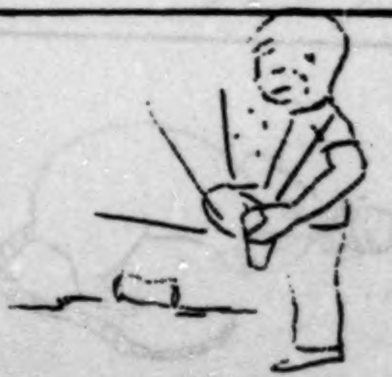
Sam is kicking. ○

Sam hid the dress. ○

Sam kicked. ○

Sam fishes. ○





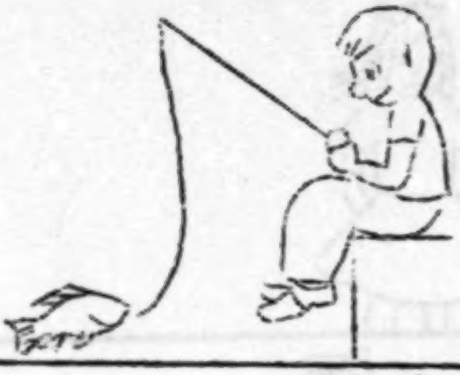
4.

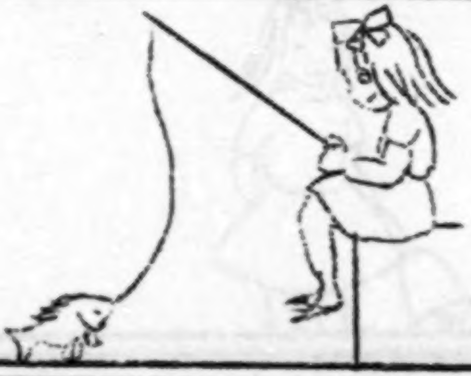
Sam drinks. ○

Sam fishes. ○

Ann fishes. ○

Ann sniffs. ○





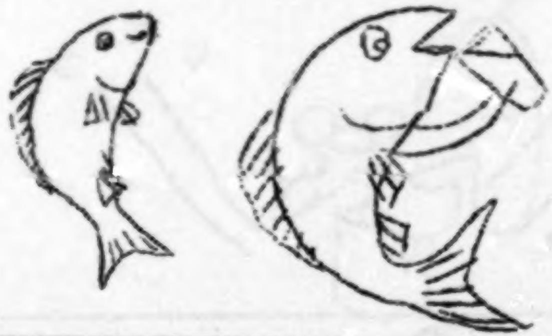
5.

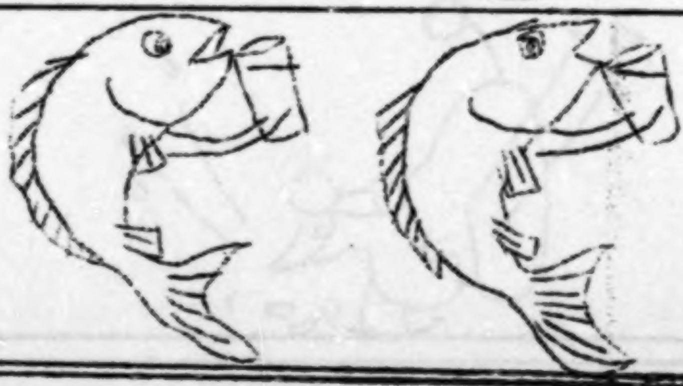
The fish sings best. ○

The fish are drinking. ○

The fish digs sand. ○

The fish is drinking. ○





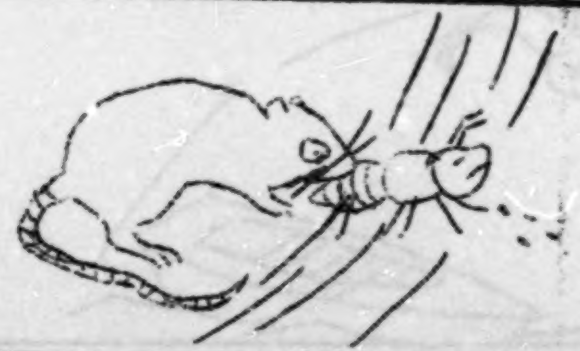
6.

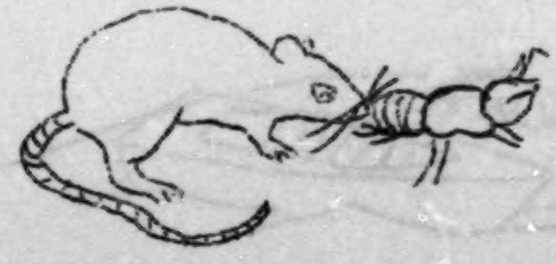
The rat bites very hard. ○

The rat is sitting on the ship. ○

The rat ran up the hill. ○

The rat bites very easy. ○





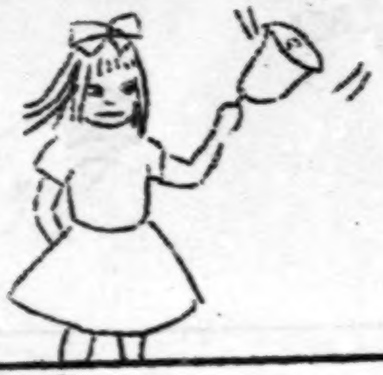
7.

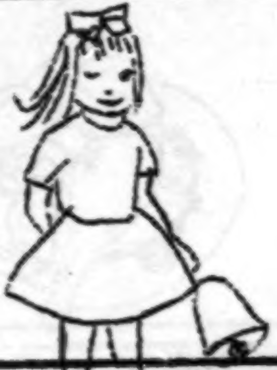
Ann is singing. 0

Ann rings the bell. 0

Ann ran fast. 0

Ann will ring the bell. 0





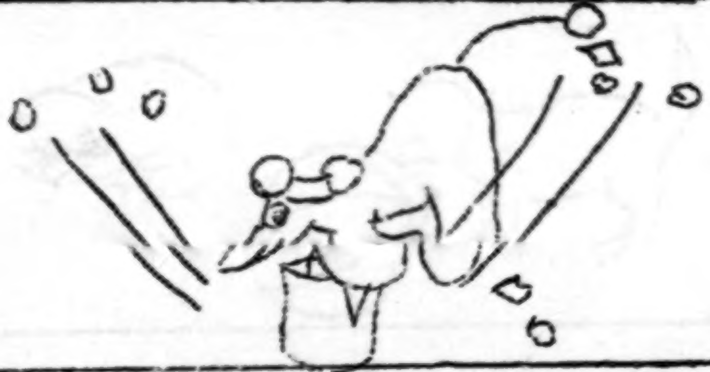
8.

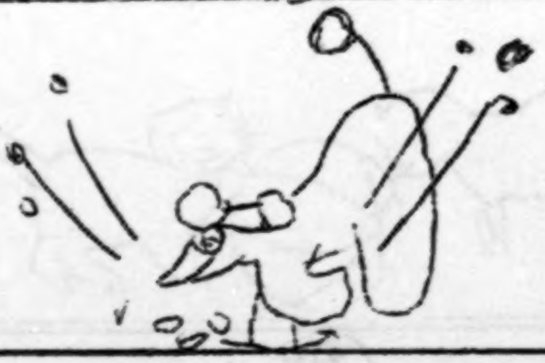
Nip bites the kitten. 0

Nip digs in the dirt. 0

Nip digs in the bag. 0

Nip went with the kitten. 0





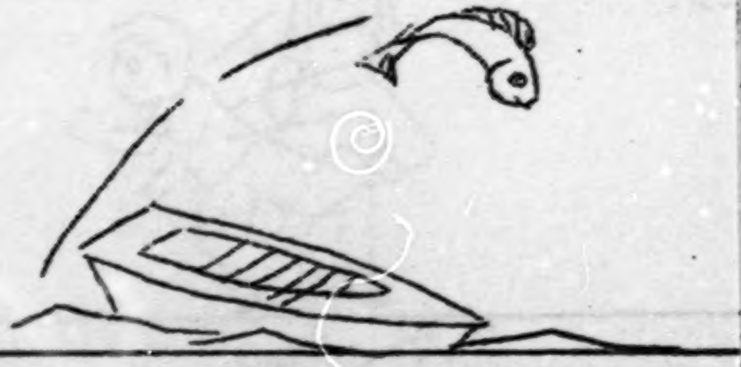
9.

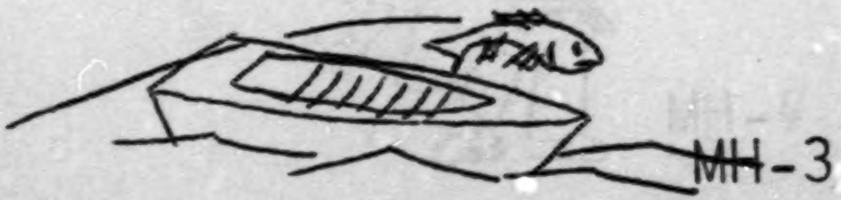
The fish jumps very high. 0

The fish snaps at the kitten. 0

The fish jumps very low. 0

The fish is red and pink. 0





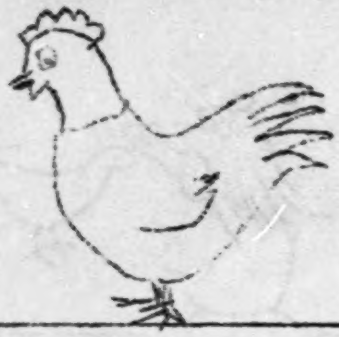
10.

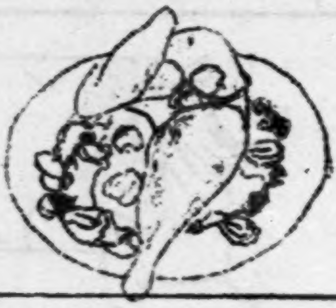
Some chicken. 0

A chicken. 0

A hat. 0

Ann's pig. 0





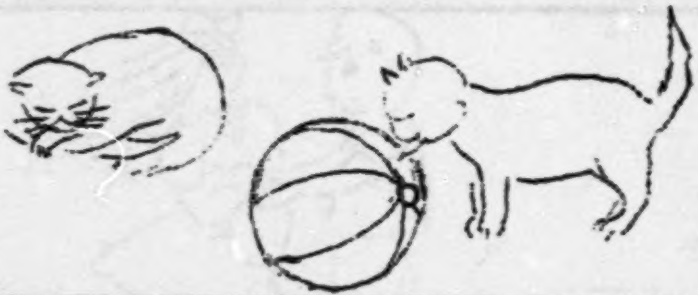
11.

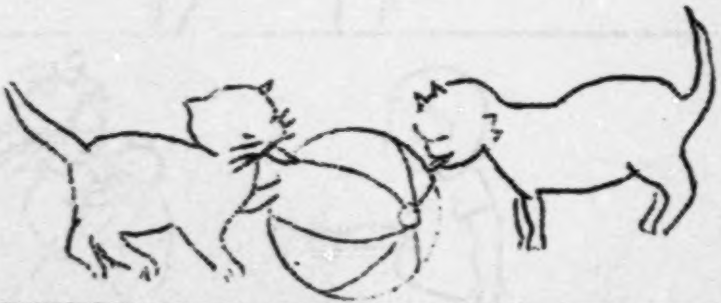
The kitten is pink. 0

The kitten licks. 0

The kitten is fast. 0

The kittens lick. 0





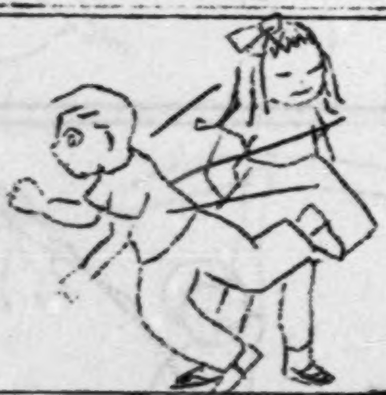
12.

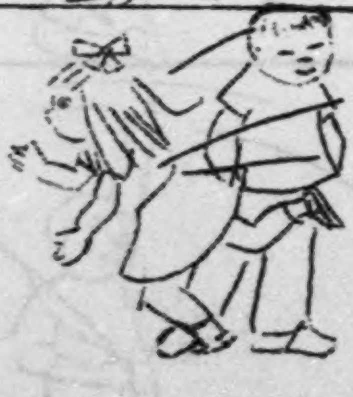
Ann is tripped by Sam. 0

Sam brings the kitten. 0

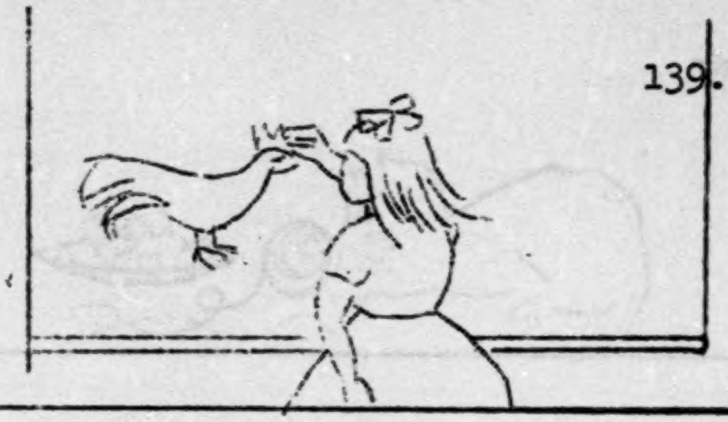
Sam is tripped by Ann. 0

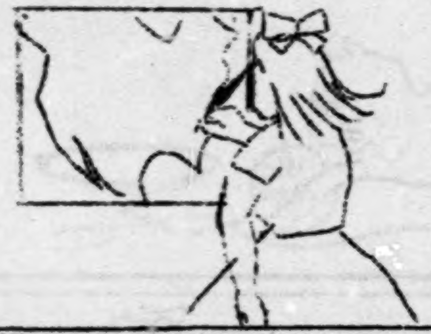
Ann pats the chicken. 0



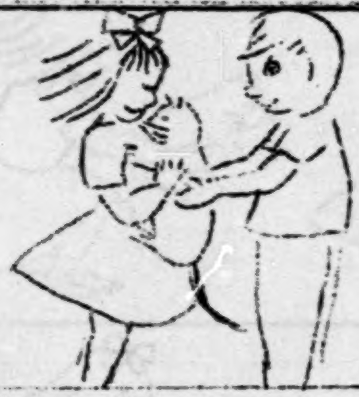


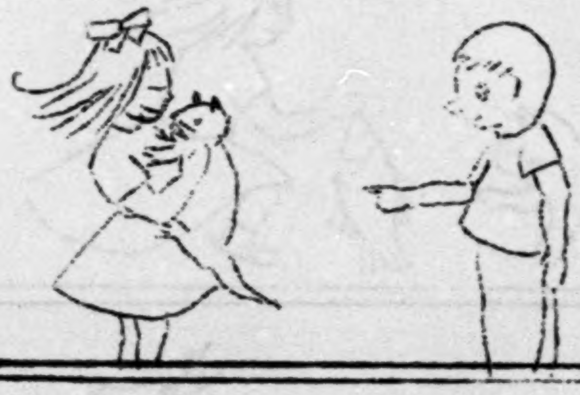
13.
Ann hits Nip and Tab. 0
Ann draws on the board. 0
Ann is skipping and singing. 0
Ann draws on the map. 0



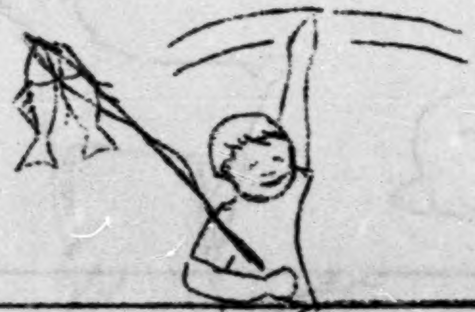


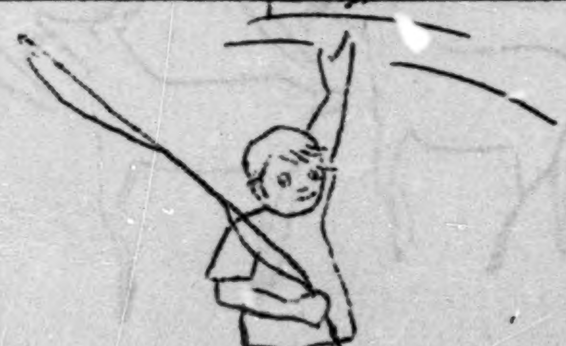
14.
Her cat. 0
Their pin. 0
Her pin. 0
Their cat. 0





15.
Sam sang to Ann. 0
Sam waves after fishing. 0
Sam waves before fishing. 0
Sam is fast. 0





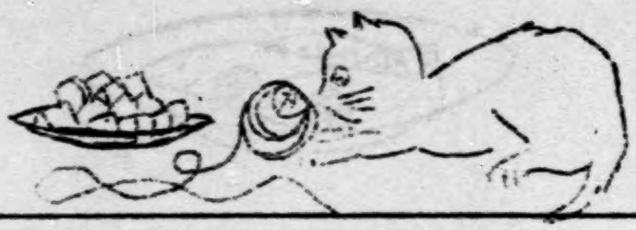
16.

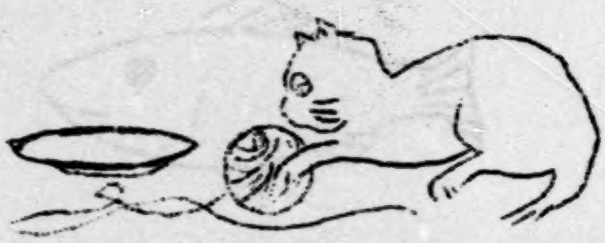
Tab played after dinner. 0

Tab spills the milk. 0

Tab bit Sam. 0

Tab played before dinner. 0





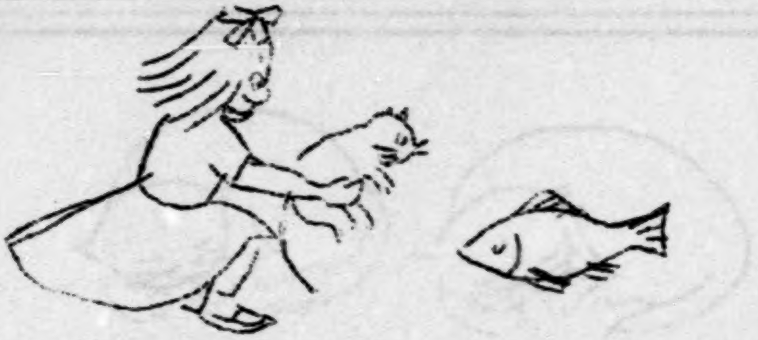
17.

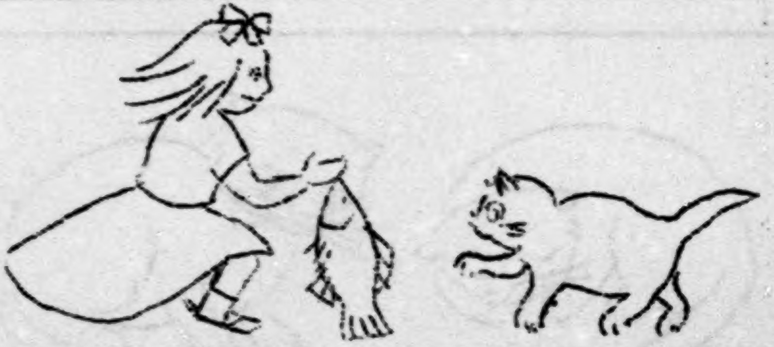
Ann fell in the grass. 0

Ann brings the fish the kitten. 0

Ann hid the hat from Sam. 0

Ann brings the kitten the fish. 0





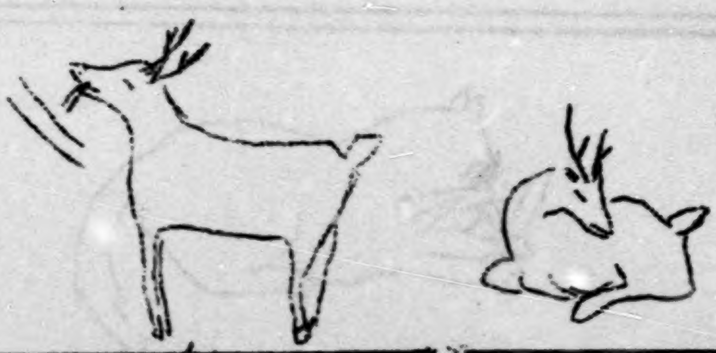
18.

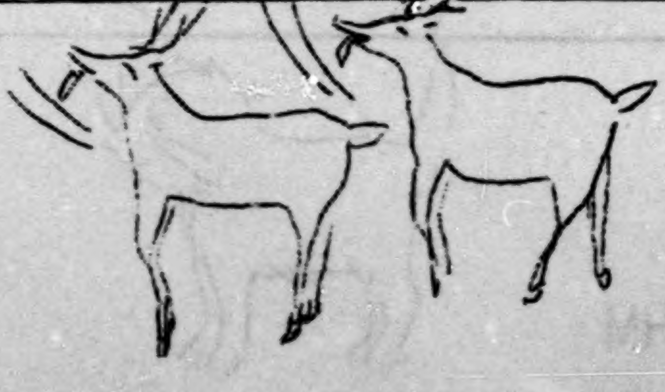
The deer rang the bell. 0

The deer licks the kitten. 0

The deer are panting. 0

The deer is panting. 0





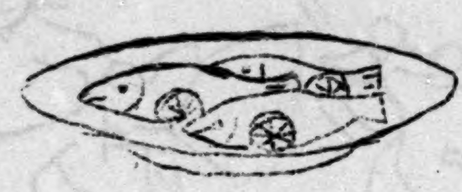
19.

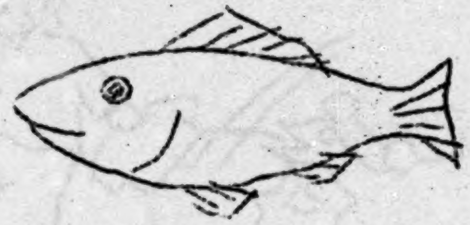
A fish. 0

Fat man. 0

Some fish. 0

Sad cat. 0





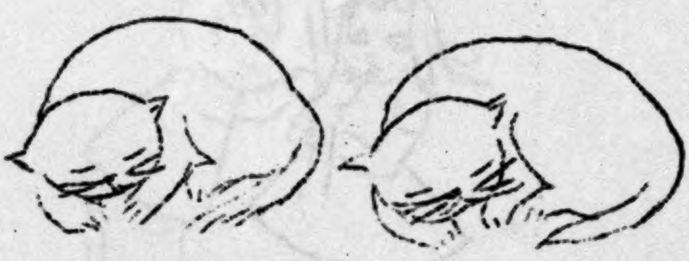
20.

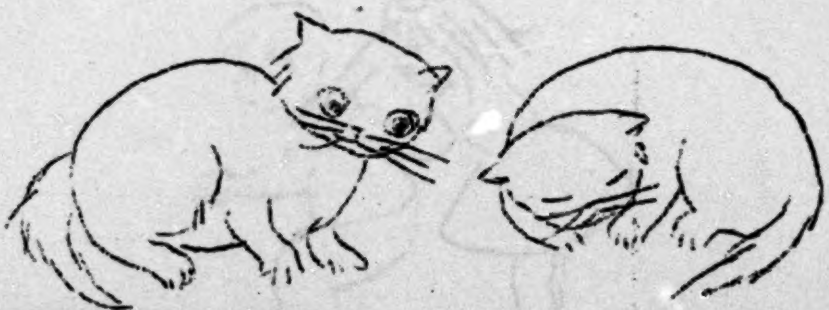
The cat fishes. 0

The cat naps. 0

The cats nap. 0

The cat is thin. 0





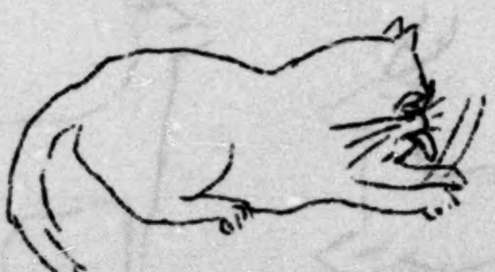
21.

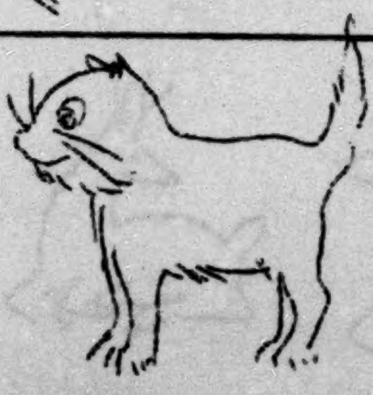
Tab is red. 0

Tab is not
panting. 0

Tab is panting. 0

Tab went crash. 0





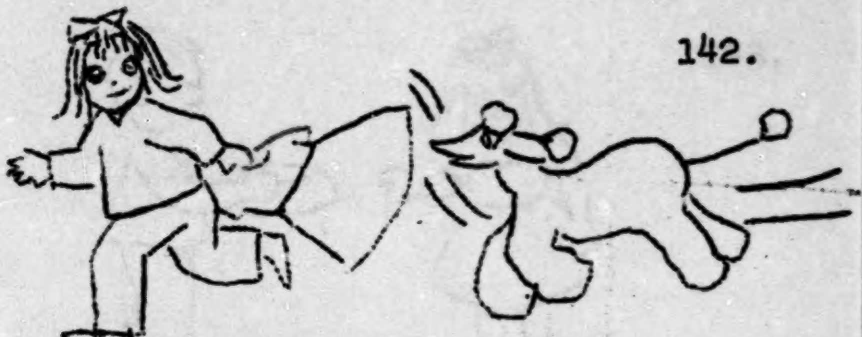
22.

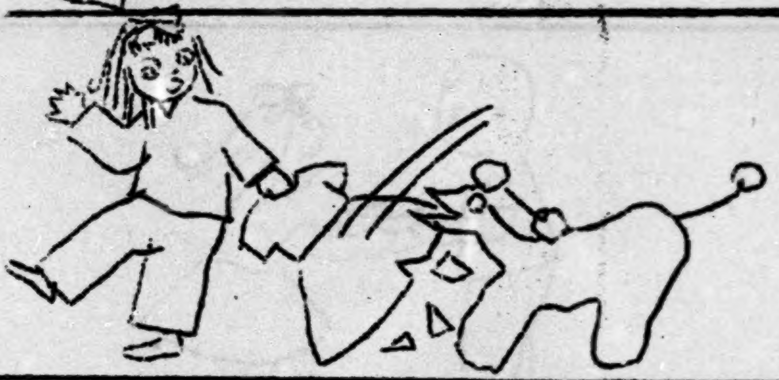
Nip sat on the hat. 0

Nip rips the dress. 0

Nip licks Tab. 0

Nip will rip the dress. 0





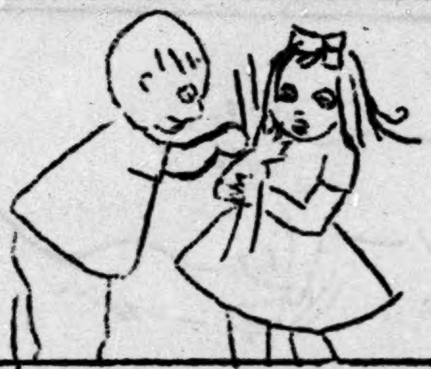
23.

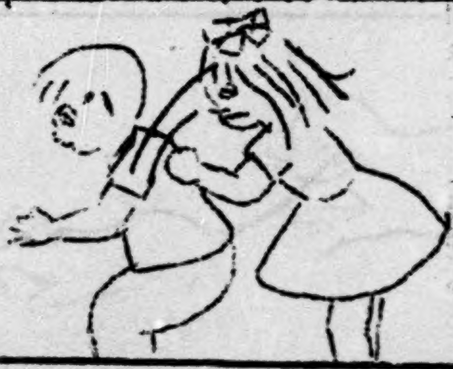
Sam hits Ann. 0

Ann kicks the bed. 0

Ann hits Sam. 0

Sam rings the bell. 0





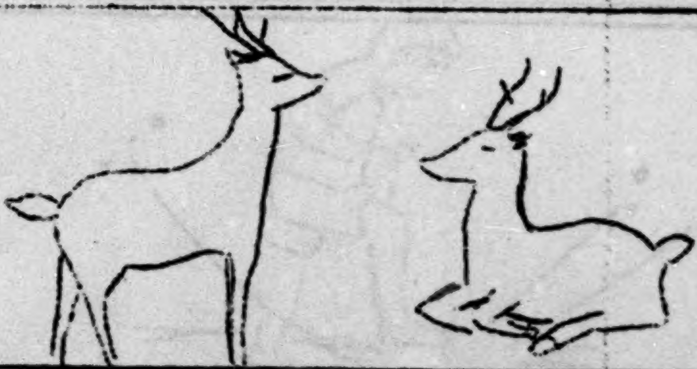
24.

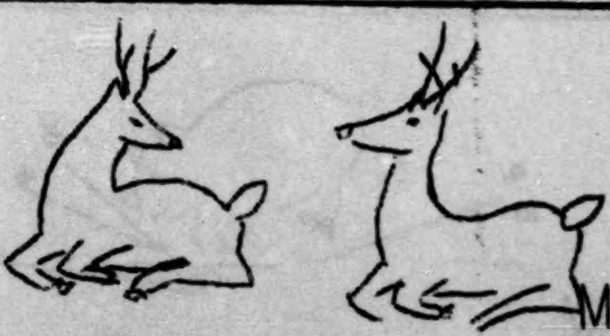
The deer bit Tab. 0

The deer sit. 0

The deer sits. 0

The deer is singing. 0





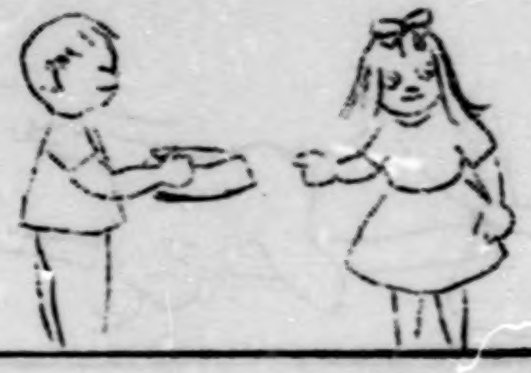
25.

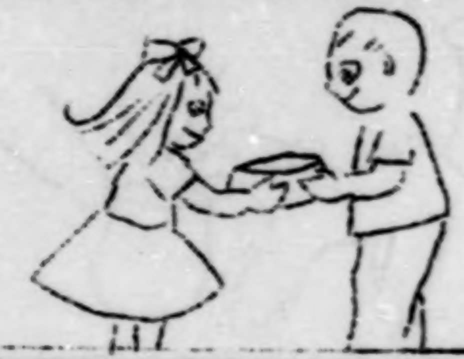
Their dish. 0

His bag. 0

Their bag. 0

His dish. 0





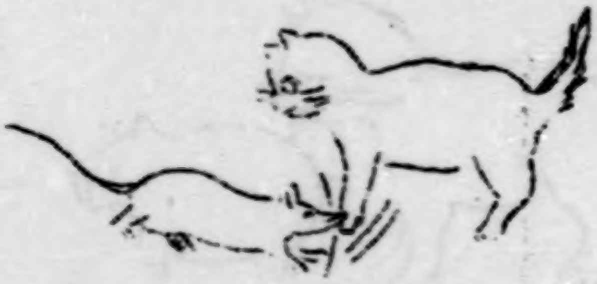
26.

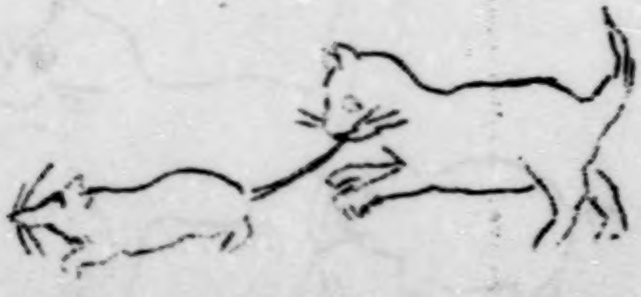
The rat ran fast. 0

The cat bit the rat. 0

The cat ripped the bag. 0

The rat bit the cat. 0





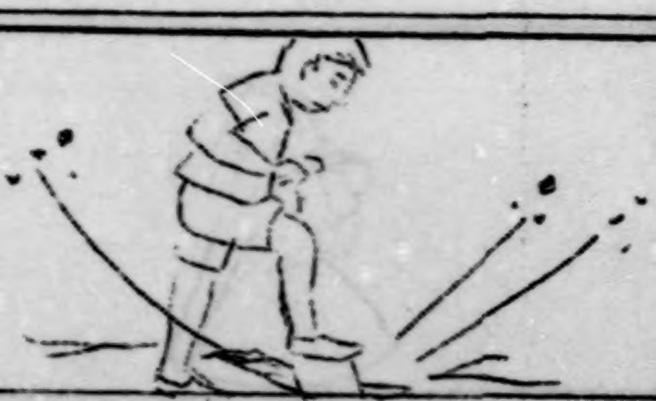
27.

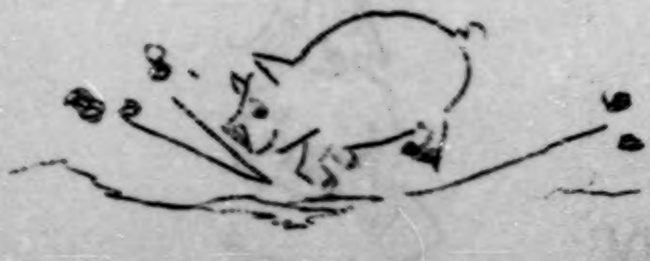
The man tripped. 0

The man digs. 0

The pig digs. 0

The pig ran fast. 0





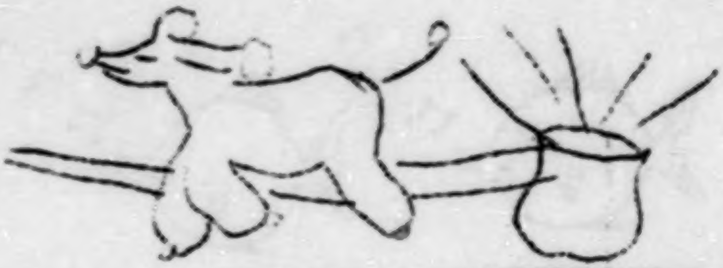
28.

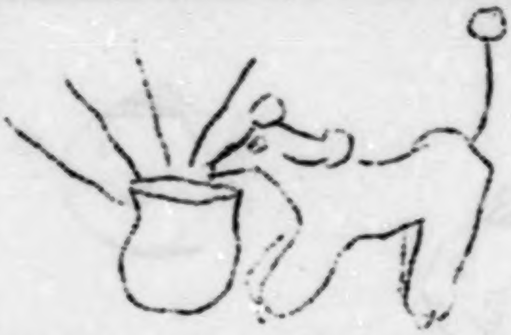
Nip catches Tab. ○

Nip sniffed. ○

Nip bit the man. ○

Nip is sniffing. ○





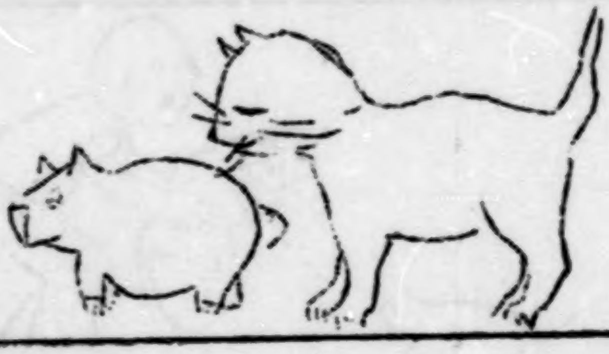
29.

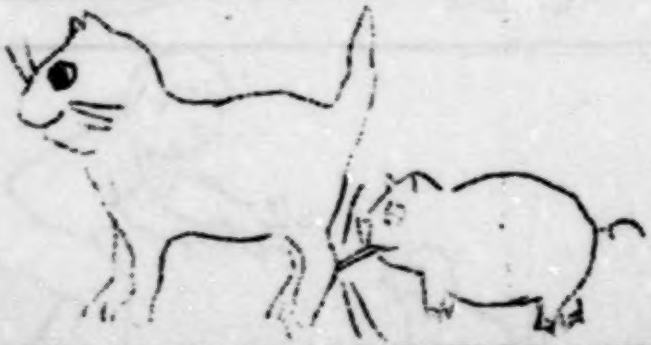
The pig is licked by the cat. ○

The cat fills the glass. ○

The cat is licked by the pig. ○

The pig ran up the hill. ○





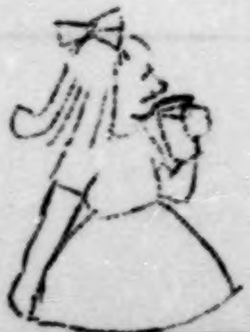
30.

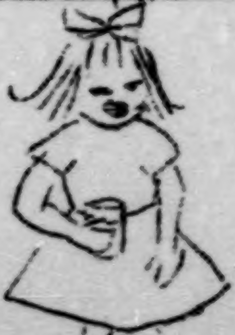
Ann sits. ○

Ann will drink. ○

Ann is drinking. ○

Ann skips fast. ○





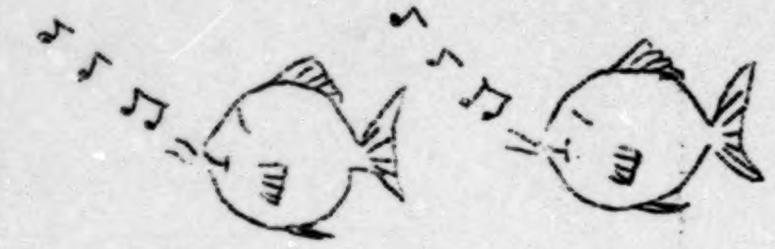
31.

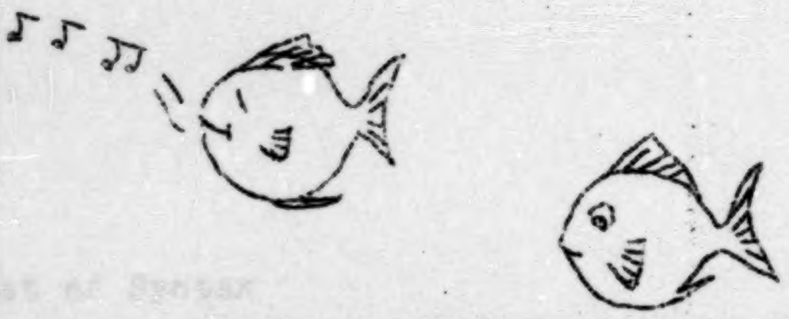
The fish sings. ○

The fish hits Ann. ○

The fish sing. ○

The fish is red. ○





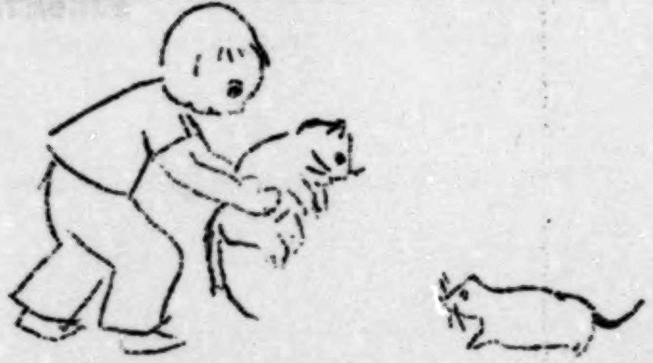
32.

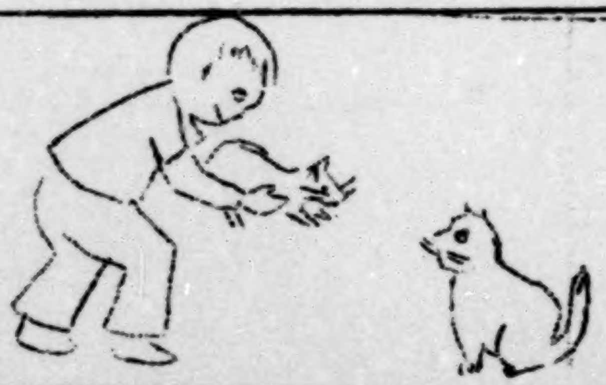
Sam sings and pants. ○

Sam gives the rat the cat. ○

Sam is sick and red. ○

Sam gives the cat the rat. ○





Primary Test of Syntax

for B and B+ Treatments

PRIMARY TEST OF SYNTAX

B and B+ Treatments

Robert B. Ruddell
Asst. Professor of Education
University of California

CHILD'S NAME ____

BIRTH DATE ____

TEACHER ____

SCHOOL ____

DATE ____

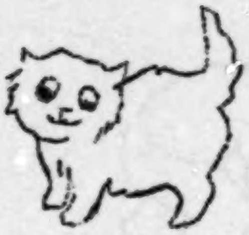
1.

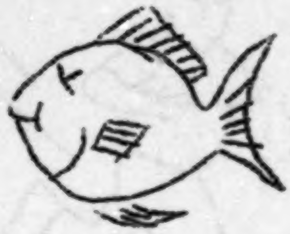
The kitten. 0

The fish. 0

A can. 0

A big can. 0





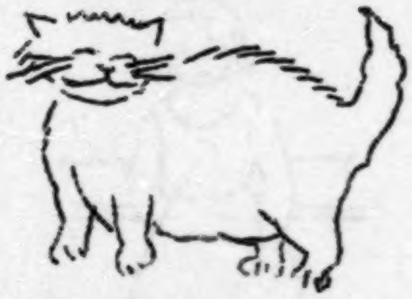
2.

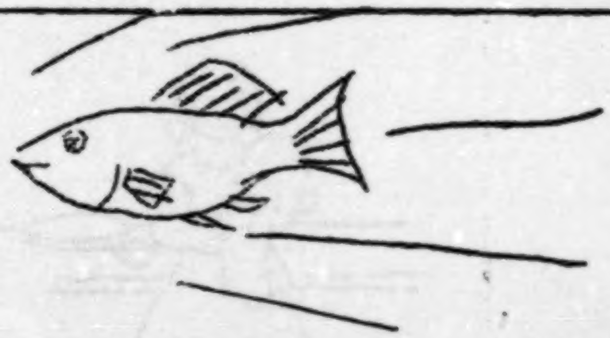
The big kitten. 0

It ran fast. 0

A fast fish. 0

It went up. 0





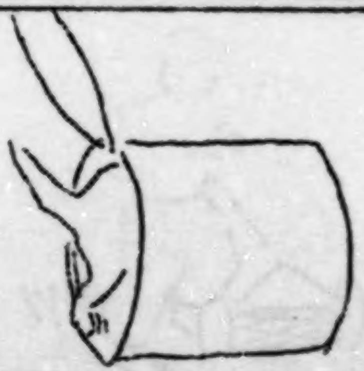
3.

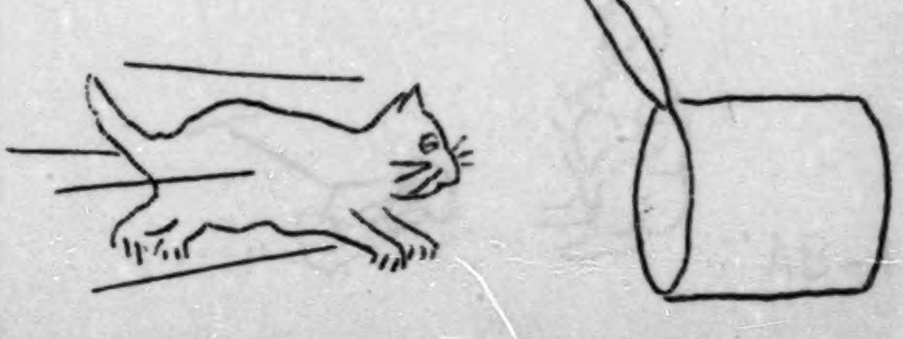
The fast kitten is black. 0

The kitten went in the can. 0

A can ran to the kitten. 0

The kitten ran to a can. 0





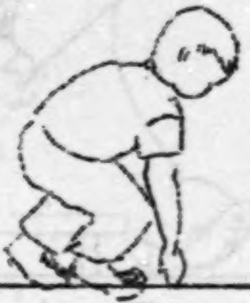
1.

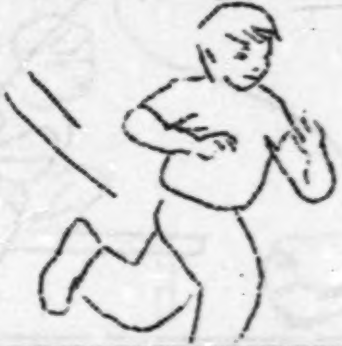
Bill will run. ○

Bill sees Linda. ○

Bill is running. ○

Bill plays with the car. ○





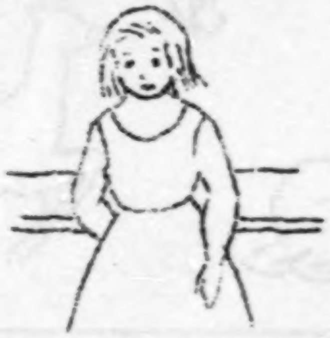
2.

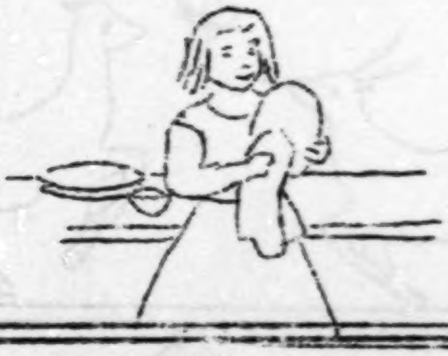
Linda is working. ○

Linda stops Ricky. ○

Linda is not working. ○

Linda gets a fish. ○





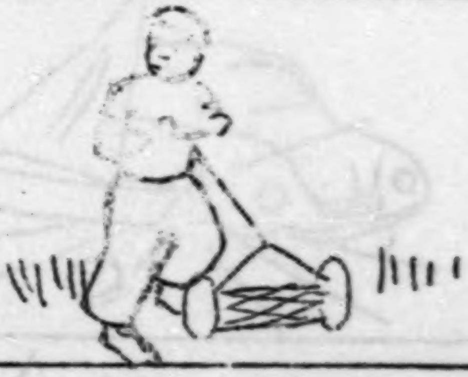
3.

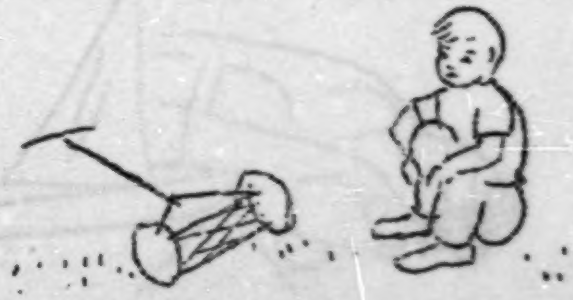
Bill is working. ○

Bill fishes. ○

Bill worked. ○

Bill looks for Rags. ○





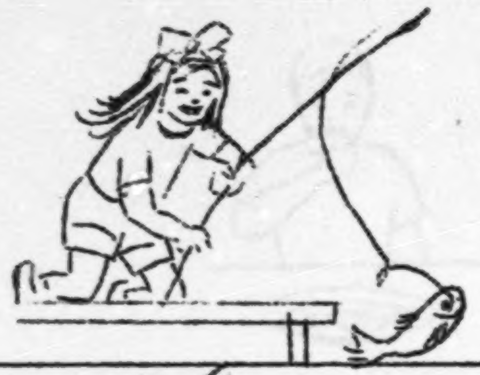
4.

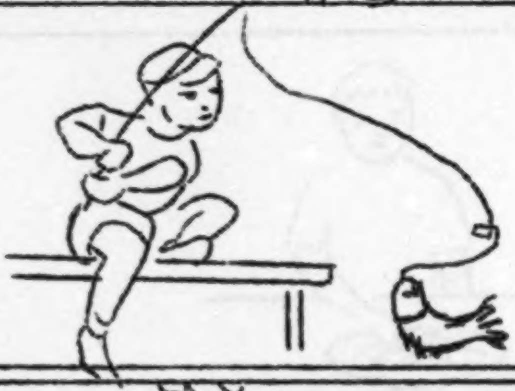
Ricky works. 0

Ricky fishes. 0

Linda fishes. 0

Linda is at home. 0





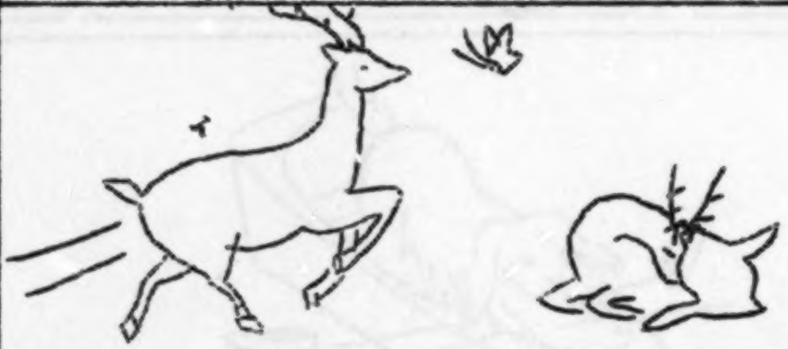
5.

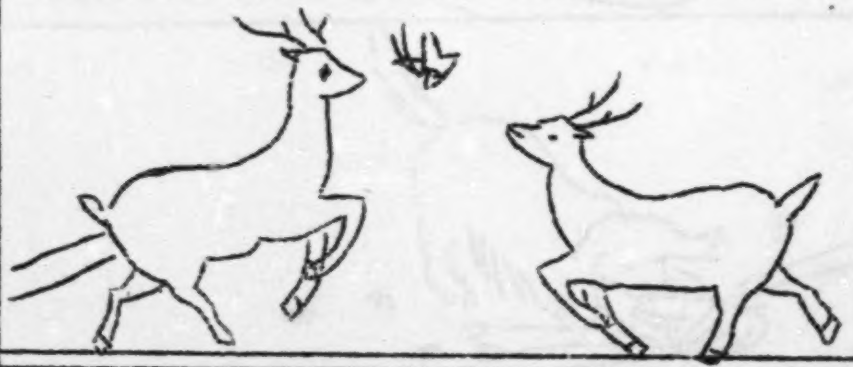
The deer is playing. 0

The deer wants ice cream. 0

The deer looks yellow. 0

The deer are playing. 0





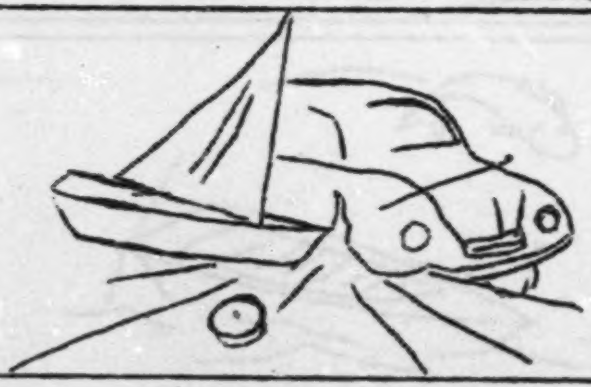
6.

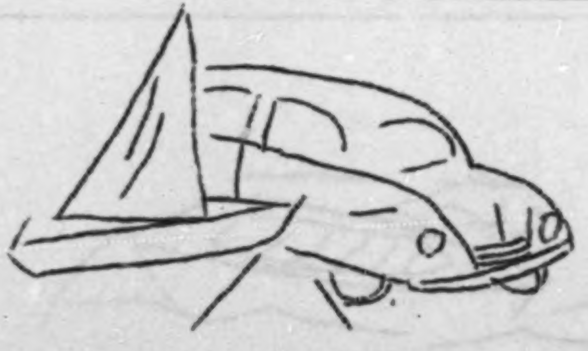
The boat runs away. 0

The boat hits very hard. 0

The boat hits very easy. 0

The boat is playing with the fish. 0





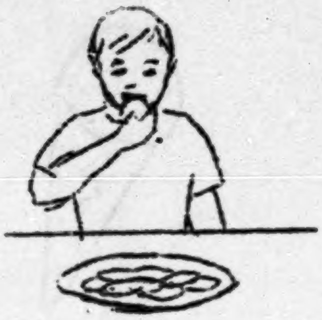
7.

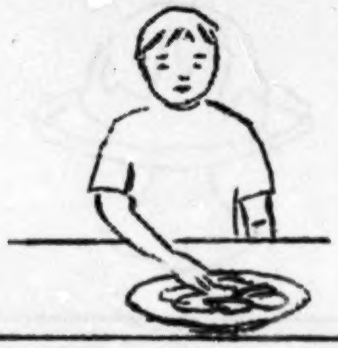
Bill eats the cookies. ○

Bill is running. ○

Bill will eat the cookies. ○

Bill wants to work. ○





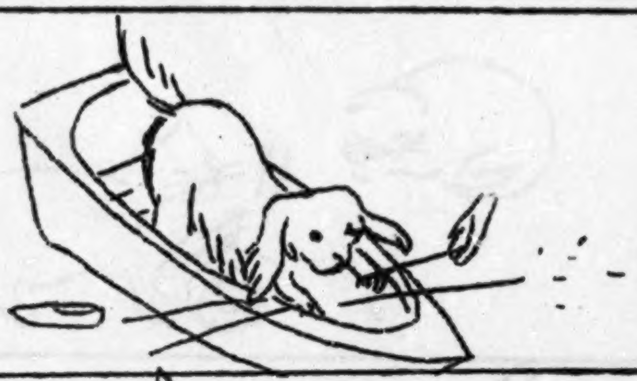
8.

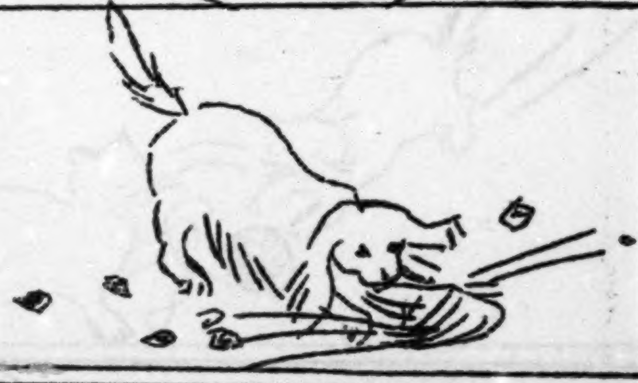
Rags jumps up and down. ○

Rags digs in the dirt. ○

Rags plays with Midnight. ○

Rags digs in the boat. ○





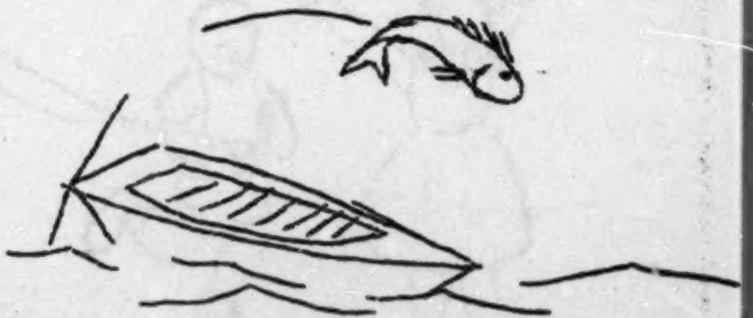
9.

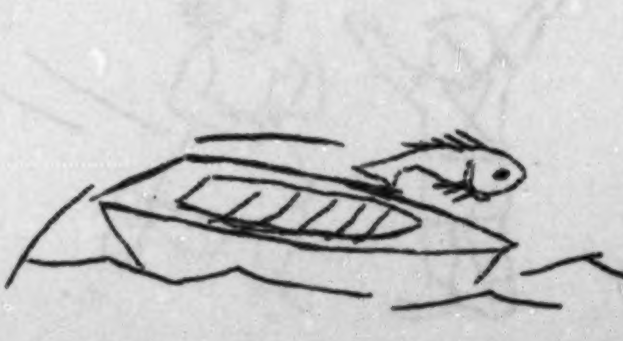
The fish jumps very low. ○

The fish is green and red. ○

The fish jumps very high. ○

The fish looks at the ice cream. ○





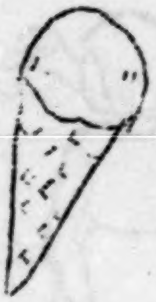
10.

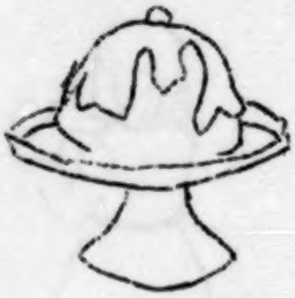
My cookies. ○

Some ice cream. ○

Bill's car. ○

An ice cream. ○





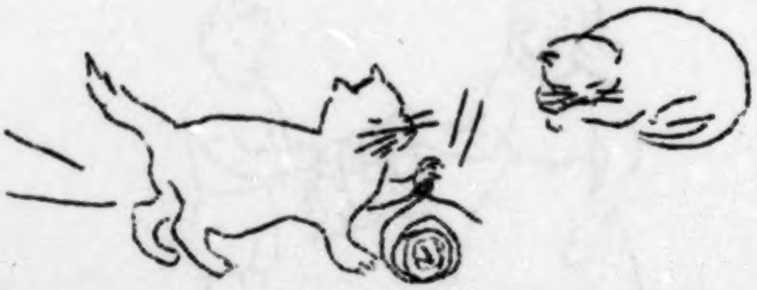
11.

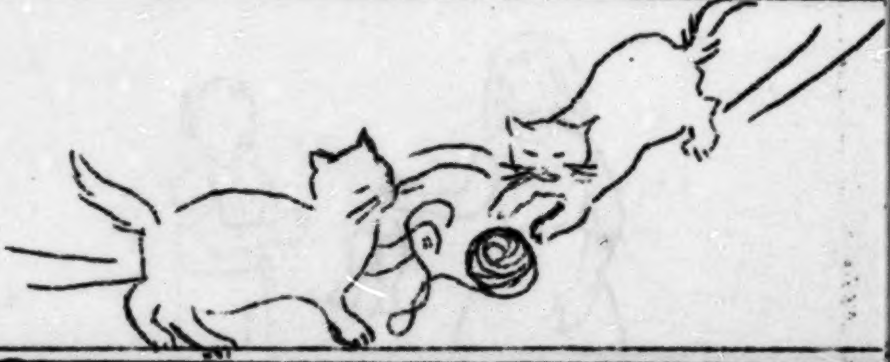
The kittens look green. ○

The kitten is fast. ○

The kittens play. ○

The kitten plays. ○





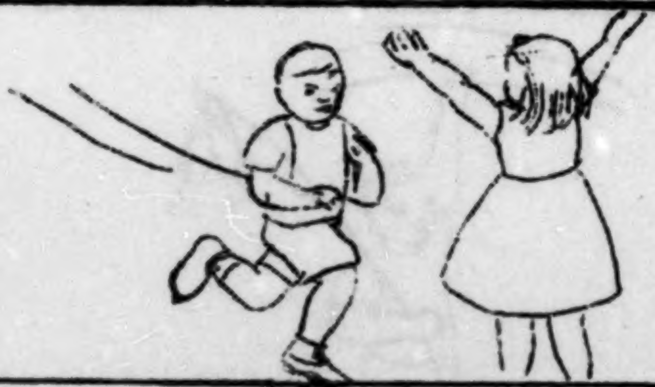
12.

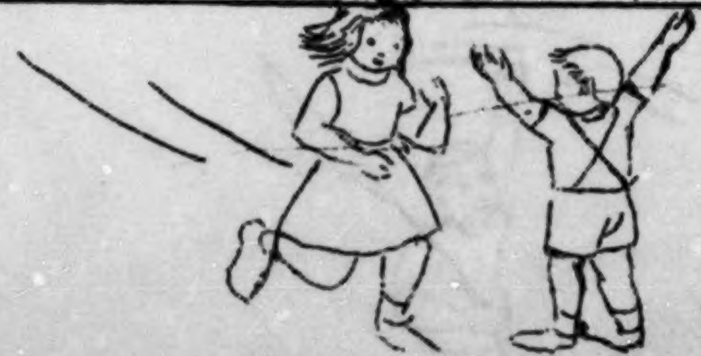
Linda is stopped by Ricky. ○

Linda rides in a car. ○

Ricky is stopped by Linda. ○

Ricky sees the funny ball. ○





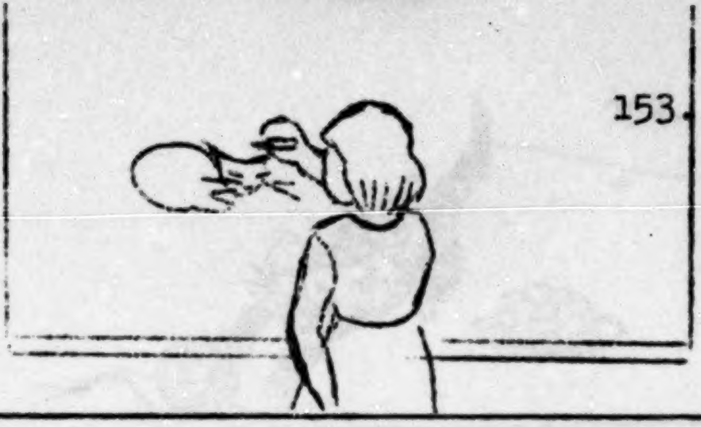
13.

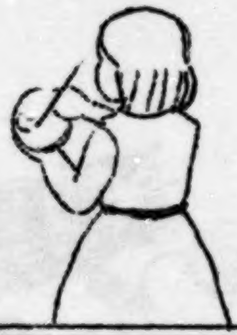
Linda jumps the car
and boat. O

Linda draws on the
board. O

Linda is running
and jumping. O

Linda draws on the
ball. O





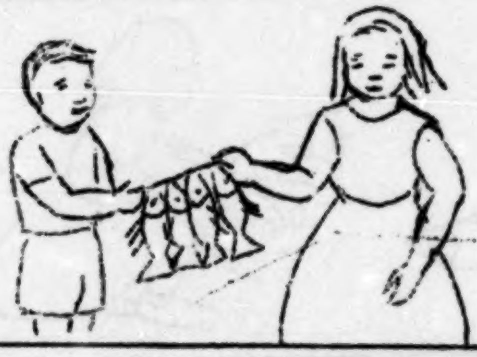
14.

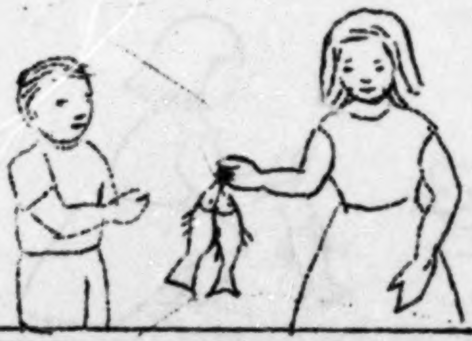
Their Rags. O

Her fish. O

Their fish. O

Her Rags. O





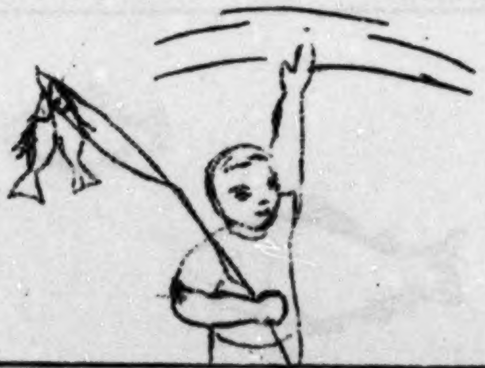
15.

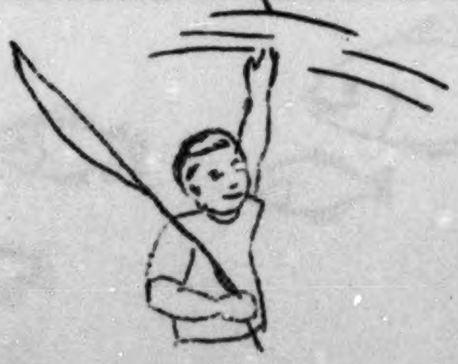
Bill waves after
fishing. O

Bill helps Daddy. O

Bill waves before
fishing. O

Bill is riding. O





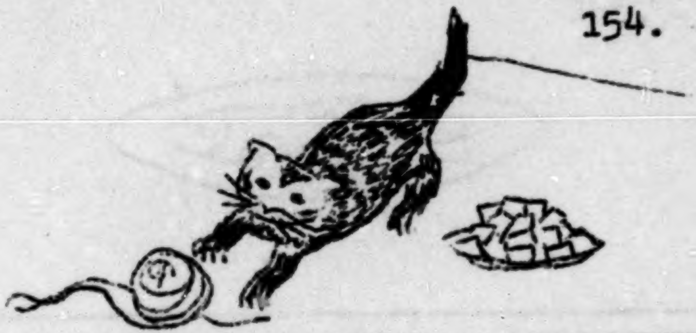
16.

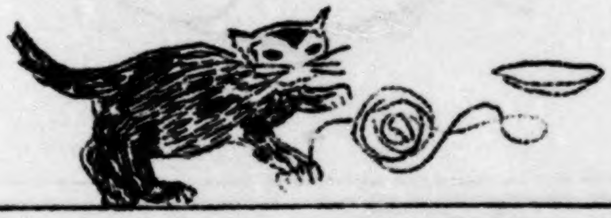
Midnight played after dinner. ○

Midnight sees the car. ○

Midnight wants to work. ○

Midnight played before dinner. ○





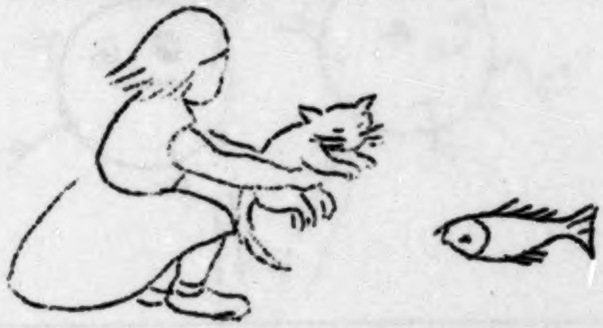
17.

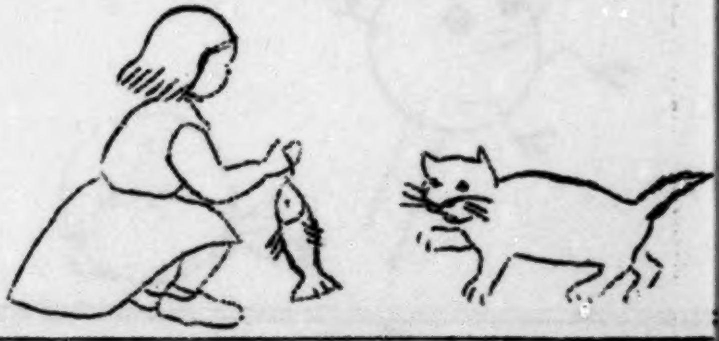
Linda is big and funny. ○

Linda brings the fish the kitten. ○

Linda gets ice cream for Ricky. ○

Linda brings the kitten the fish. ○





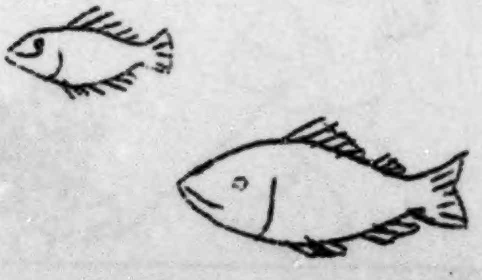
18.

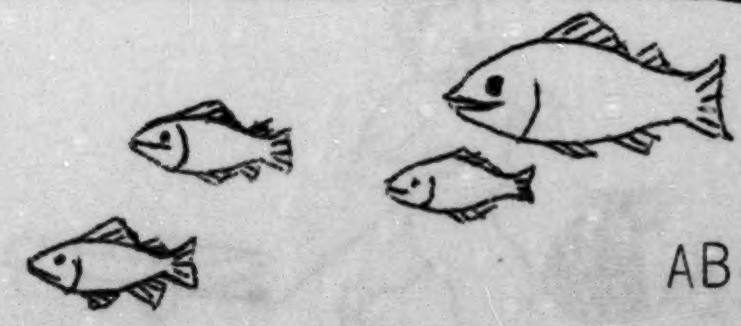
The fish is little. ○

The fish jumps up. ○

The fish are little. ○

The fish works fast. ○





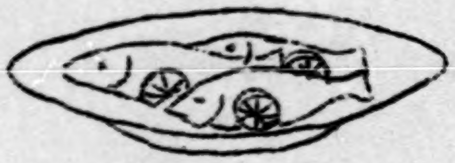
19.

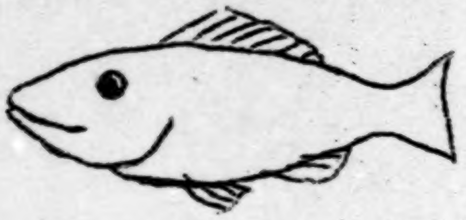
Some fish. ○

Go fast. ○

Help me. ○

A fish. ○





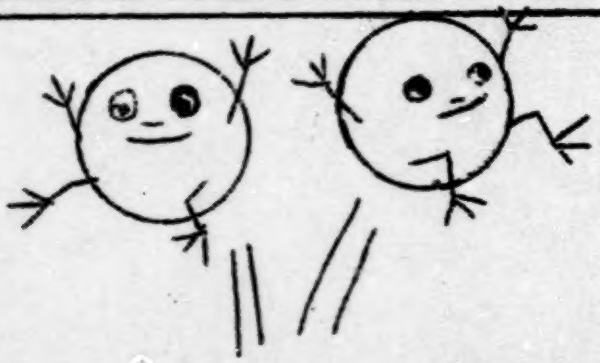
20.

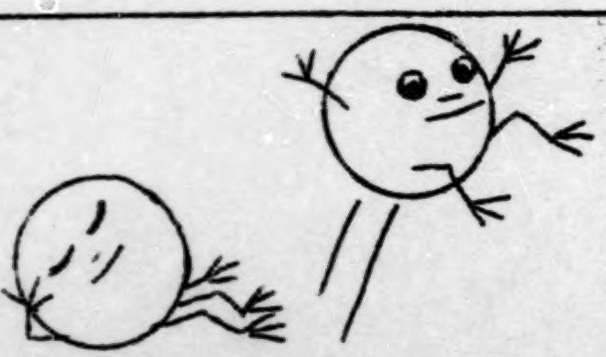
The ball is yellow. ○

The ball jumps. ○

The ball helps
Daddy. ○

The balls jump. ○





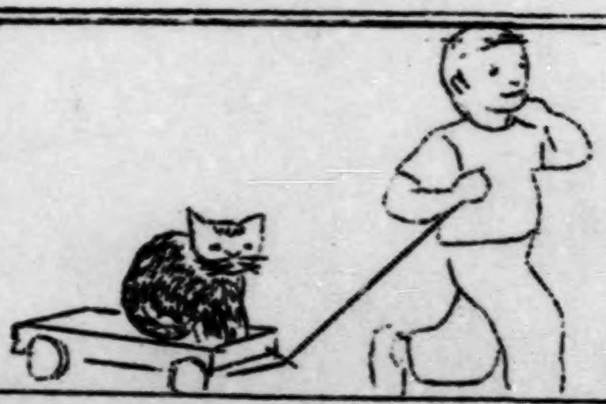
21.

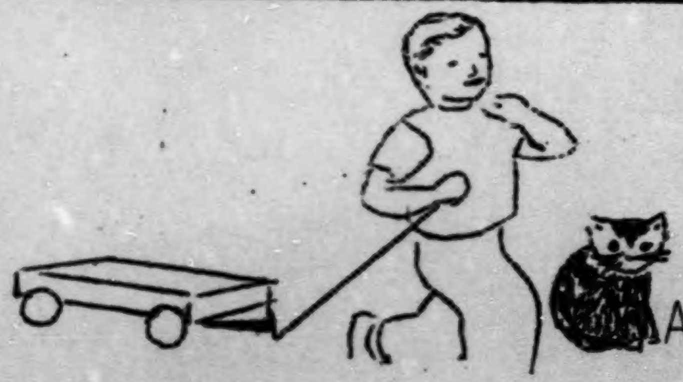
Midnight is blue. ○

Midnight is riding. ○

Midnight is not
riding. ○

Midnight jumps
down. ○





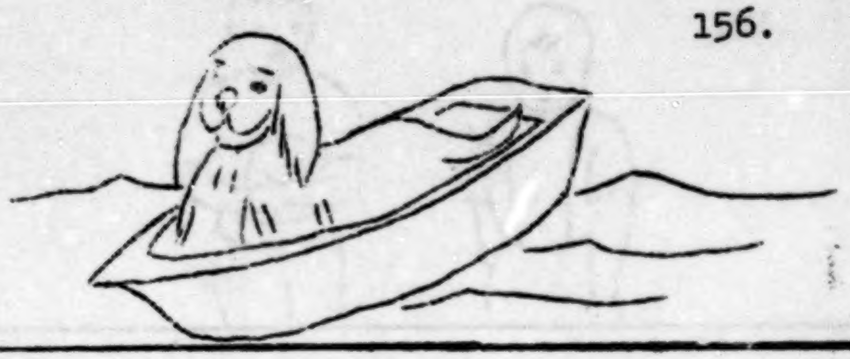
22.

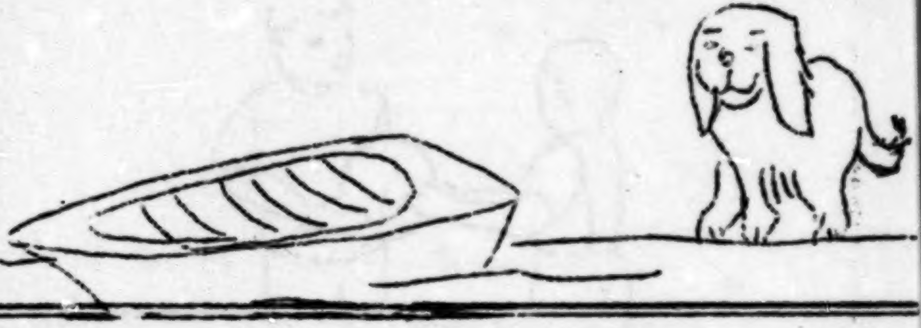
Rags is fishing. ○

Rags makes ice cream. ○

Rags rides the boat. ○

Rags will ride the boat. ○





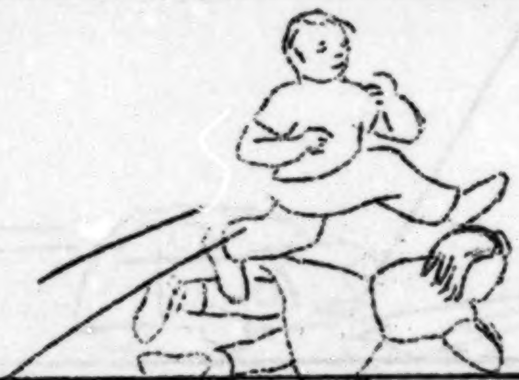
23.

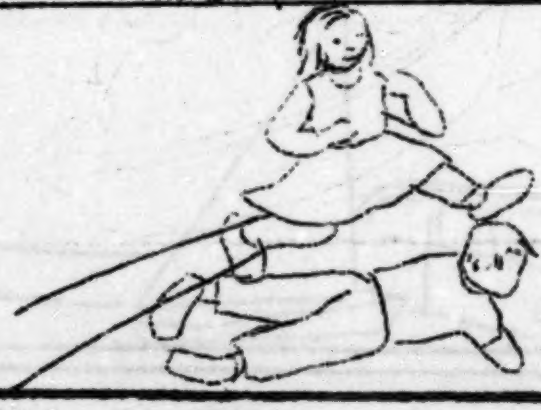
Bill jumps Linda. ○

Linda helps Ricky. ○

Linda jumps Bill. ○

Bill stops the ball. ○





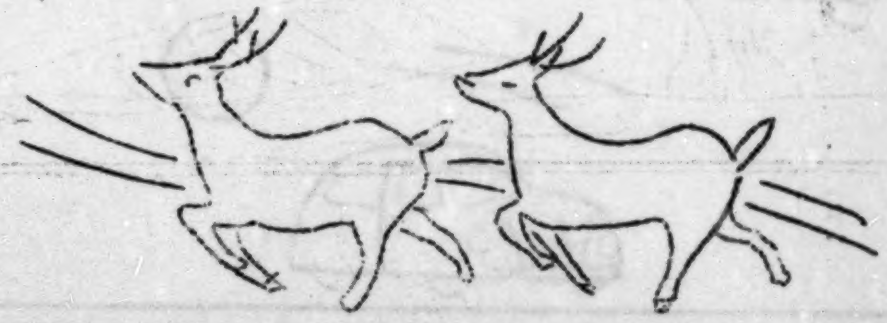
24.

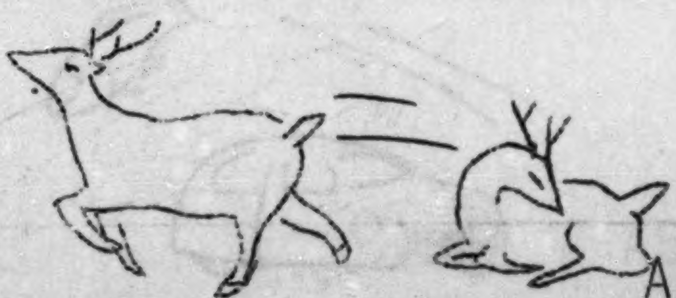
The deer is funny. ○

The deer run. ○

The deer rides Rags. ○

The deer runs. ○





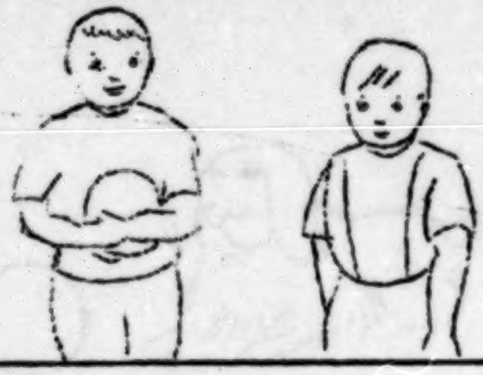
25.

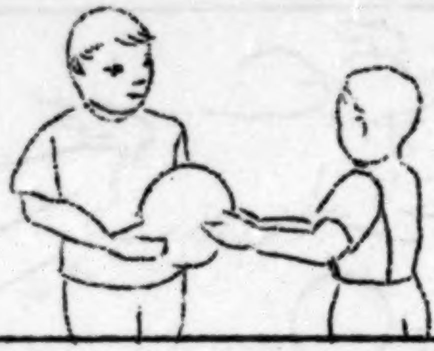
Their ball. 0

His car. 0

His ball. 0

Their car. 0





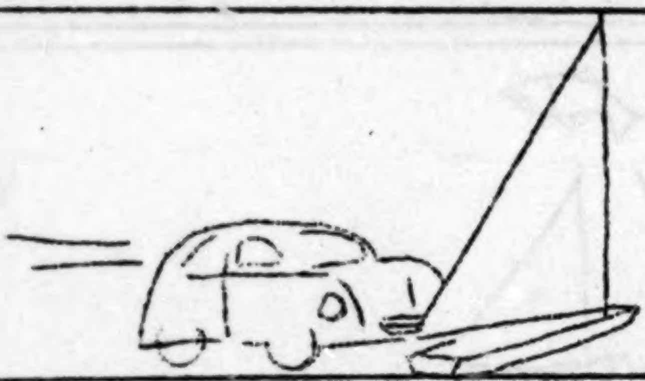
26.

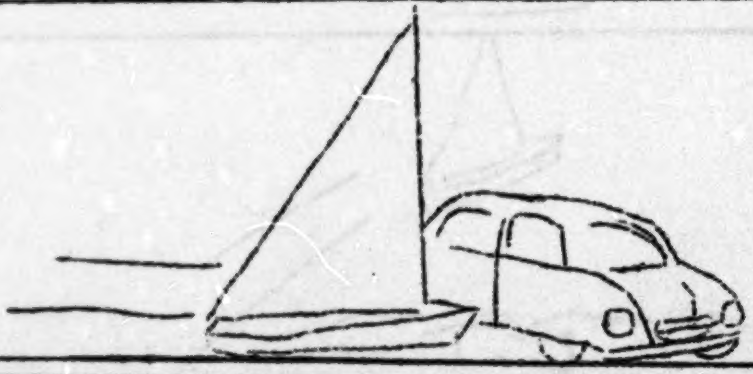
The car goes fast.0

The boat stops the car. 0

The boat runs away. 0

The car stops the boat. 0





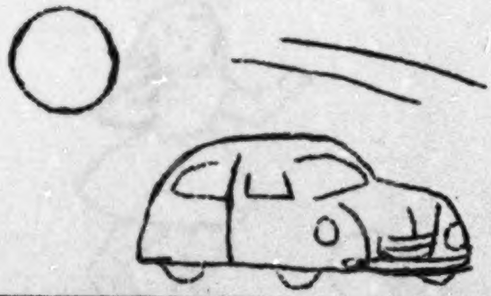
27.

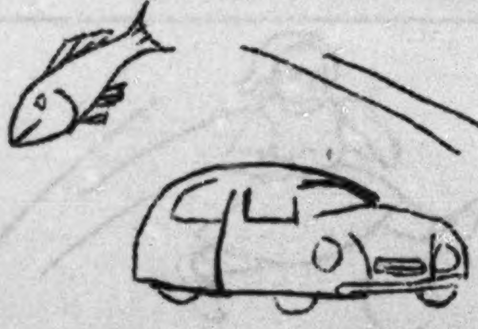
The ball is green.0

The ball jumps. 0

The fish jumps. 0

The fish is funny. 0





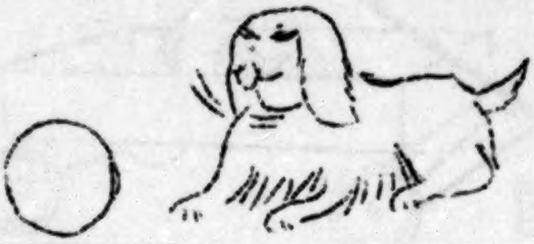
28.

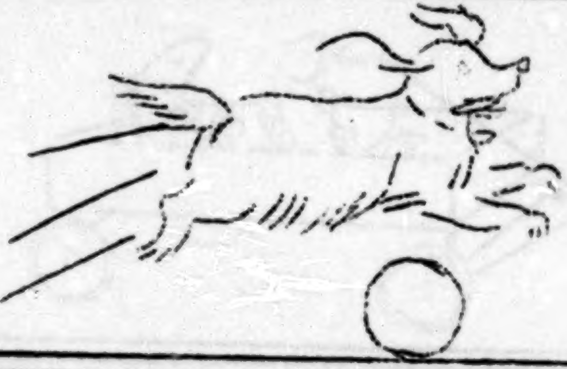
Rags is playing. ○

Rags gets Midnight. ○

Rags played. ○

Rags helped Daddy. ○





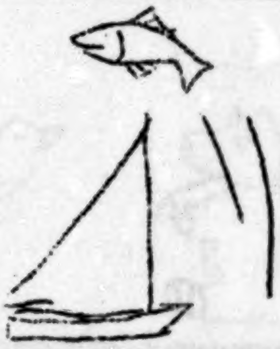
29.

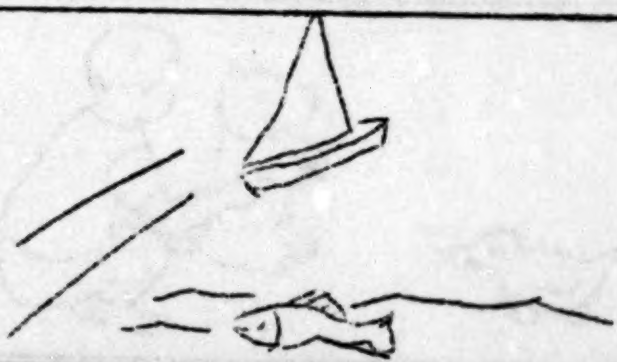
The boat can go very fast. ○

The fish wants to see the ball. ○

The boat is jumped by the fish. ○

The fish is jumped by the boat. ○





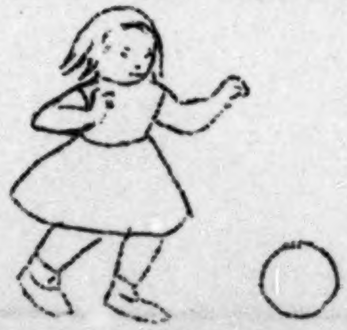
30.

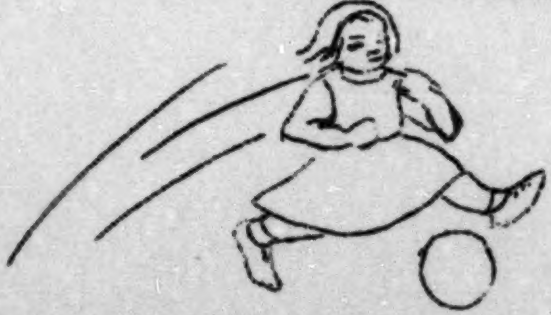
Linda is jumping. ○

Linda comes home. ○

Linda will jump. ○

Linda helps Rags. ○





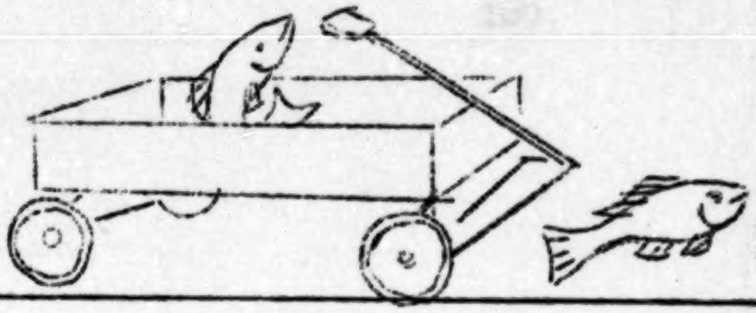
31.

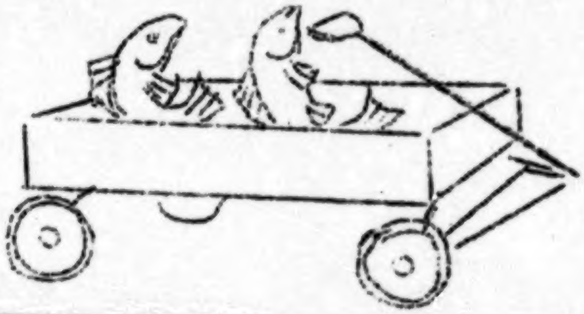
The fish is red. ○

The fish ride. ○

The fish makes cookies. ○

The fish rides. ○





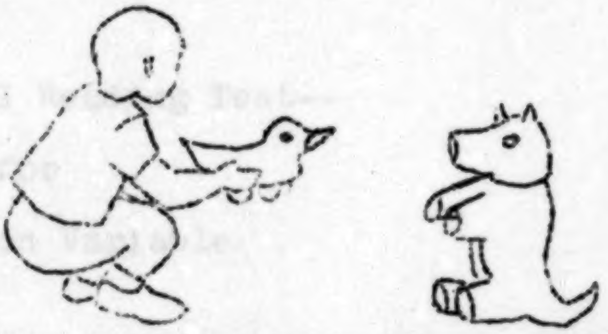
32.

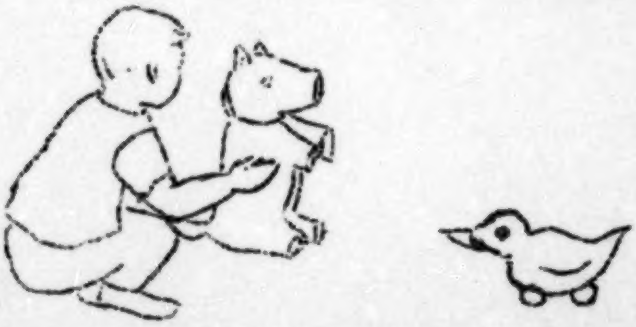
Bill gives the duck the dog. ○

Bill jumps and plays. ○

Bill gives the dog the duck. ○

Bill is fast and blue. ○





APPENDIX B

Phonetically Regular Words Oral Reading Test--
Criterion Measure for
Regular Word Identification Variable

PHONETICALLY REGULAR WORDS ORAL READING TEST

Child's Name____________________Date______________________________

School__________________________Room______Code Number___________

Examiner_________________________Number of words read correctly___

1. nap
2. pen
3. hid
4. job
5. rug
6. shade
7. drive
8. joke
9. mule
10. plain
11. hay
12. keen
13. least
14. loan
15. show
16. walk
17. haul
18. jaw
19. soil
20. joy
21. frown
22. trout
23. term
24. curl
25. birch
26. rare
27. star
28. porch
29. smooth
30. shook

Directions: Have pupil read words from one copy while examiner makes another copy. Do not give pupil a second chance but accept immediate self-correction. Let every student try the whole first column. If he gets two words correct from word number six on, let him try the whole second column.

APPENDIX C

Gates Word Pronunciation Test--
Criterion Measure for
Irregular Word Identification Variable

GATES WORD PRONUNCIATION TEST

1. so
2. we
3. as
4. go
5. the
6. not
7. how
8. may
9. king
10. here
11. grow
12. late
13. every
14. about
15. paper
16. blind
17. window
18. family
19. perhaps
20. plaster
21. passenger
22. wander
23. interest
24. chocolate
25. dispute
26. portion
27. conductor
28. brightness
29. intelligent
30. construct
31. position
32. profitable
33. irregular
34. schoolmaster
35. lamentation
36. community
37. satisfactory
38. illustrious
39. superstition
40. affectionate

APPENDIX D

Criterion Tests Administered As Part Of
Total Data Collection For The
University of Minnesota Coordinating Center

ests Administered as Part of Total Data Collection for the University of Minnesota Coordinating Center

Harcourt, Brace & World, Inc., 1964

1. Stanford Achievement Test, Primary I--Spelling.
2. Stanford Achievement Test, Primary I--Vocabulary.
3. Stanford Achievement Test, Primary I--Arithmetic.

Harcourt, Brace & World, Inc., 1951

4. Gilmore Oral Reading Test--Accuracy Test.
5. Gilmore Oral Reading Test--Rate Test.

6. An Inventory of Reading Attitude, San Diego County--Attitude Inventory.
7. Writing Sample--Unique Stimulus Measure--Topic: "The Person I Would Most Like to be Like," Time limit: 20 minutes.
    a. Total number of words spelled correctly.
    b. Total number of running words.
    c. Average sentence length.
    d. Average communication length--based on analysis criteria discussed in The Language of Elementary School Children, by Walter D. Loban, National Council of Teachers of English, Champaign, Illinois, 1963. (Number of running words plus number of communication units.)
    e. Mechanical Ratio Scale:

$$\frac{\text{all numerators below added together}}{\text{all denominators below added together}}$$

(1) Capital ratio:

$$\frac{\text{number of words child capitalized correctly}}{\text{number of words that should have been capitalized}}$$

(2) Punctuation ratio:

$$\frac{\text{number of punctuation marks used by child}}{\text{number of punctuation marks that should have been used}}$$

(3) Indentation ratio:

$$\frac{\text{number of indentations used by child}}{\text{number of indentations that should have been used}}$$

APPENDIX E

Adjusted Means and t Values for Dependent Variable Scores on (1) B,P and B+,P+ and (2) B,B+ and P,P+ Program Contrasts Collected for the University of Minnesota Coordinating Center

(1) Adjusted Means and t Values for Dependent Variable Scores on the B,P and B^+,P^+ Contrasts Collected for the University of Minnesota Coordinating Center

Dependent Variable	Group B	Group P	t value	Group B+	Group P+	t value	Covariate
Stanford Achievement Test--Spelling	8.246 (132)	8.979 (135)	1.454	7.639 (156)	10.536 (116)	5.735*	Murphy-Durrell Diagnostic Reading Readiness Test
Gilmore Accuracy	17.68 (44)	16.62 (41)	.524	14.81 (42)	16.27 (40)	.721	Metropolitan Readiness Test
Gilmore Oral	51.84 (43)	46.81 (40)	.876	56.62 (39)	53.26 (39)	.558	Metropolitan Readiness Test
San Diego Attitude Inventory	18.31 (124)	18.48 (128)	.338	17.06 (146)	17.30 (113)	.490	Murphy-Durrell Diagnostic Reading Readiness Test
Writing Sample--Total Number Words Spelled	13.64 (121)	17.64 (123)	2.665*	16.21 (142)	20.08 (113)	2.787*	Metropolitan Readiness Test
Writing Sample--Total Number Running Words	15.67 (122)	20.05 (123)	2.720*	17.85 (142)	21.54 (113)	2.290*	Metropolitan Readiness Test
Writing Sample--Average Sentence Length	7.62 (121)	8.61 (122)	1.259	7.37 (143)	6.14 (113)	1.559	Metropolitan Readiness Test
Writing Sample--Average Communication Unit	5.44 (122)	5.12 (122)	.906	5.92 (142)	5.10 (113)	2.346*	Metropolitan Readiness Test

*Significant at the .05 level.

(2) Adjusted Means and t Values for Dependent Variable Scores on B,B+ and P,P+ Program Contrasts Collected for the University of Minnesota Coordinating Center

Dependent Variable	Group B	Group B+	t value	Group P	Group P+	t value	Covariate
Stanford Achievement Test--Vocabulary	19.01 (132)	18.74 (156)	.471	19.96 (134)	19.84 (122)	.183	Metropolitan Readiness Test
Stanford Achievement Test--Arithmetic	31.18 (129)	32.07 (154)	.765	32.40 (132)	32.07 (121)	.267	Metropolitan Readiness Test
Gilmore Accuracy	17.68 (44)	14.81 (42)	1.481	16.62 (41)	16.27 (40)	.169	Metropolitan Readiness Test
Gilmore Oral	51.84 (43)	56.62 (39)	.795	46.81 (40)	53.26 (39)	1.074	Metropolitan Readiness Test
San Diego Attitude Inventory	18.31 (124)	17.06 (146)	2.559*	18.48 (128)	17.30 (113)	2.230*	Murphy-Durrell Diagnostic Reading Readiness Test
Writing Sample--Mechanical Ratio	54.61 (121)	60.83 (142)	1.868	55.06 (122)	53.94 (113)	.326	Murphy-Durrell Diagnostic Reading Readiness Test
Writing Sample--Total Number Running Words	15.67 (122)	17.85 (142)	1.468	20.05 (123)	21.54 (113)	.925	Metropolitan Readiness Test
Writing Sample--Average Sentence Length	7.62 (121)	7.37 (143)	.337	8.61 (122)	6.14 (113)	3.129*	Metropolitan Readiness Test
Writing Sample--Average Communication Unit	5.44 (122)	5.92 (142)	1.487	5.12 (122)	5.10 (113)	.067	Metropolitan Readiness Test

*Significant at the .05 level.

APPENDIX F

Information on Teachers
and Number of Books
Read by Children

Information on Teachers and Number of Books Read by Children

Variable	Group B	Group B+	Group P	Group P+
Years Teaching Experience	13.5	17.7	11.3	9.3
Years Teaching First Grade	12.0	7.2	4.8	5.8
Teacher Age	42.8	42.8	43.3	33.7
Number of Books Read by Children	9.8	10.9	16.5	12.4

APPENDIX G

Syntax Record--
Used to Record Oral Language
Responses of Children

Form 10/20/64

SYNTAX RECORD--FORM A

Date________

Time Stopped________

Examiner's Name_________________________

Time Started________

Total Time________

Child's Name_______________School___________Teacher______________

_____1. A string	Some string
_____2. A paper	Some paper
_____3. The boy draws.	The boys draw.
_____4. The dog digs.	The dogs dig.
_____5. The deer runs.	The deer run.
_____6. The sheep jumps.	The sheep jump.
_____7. The sheep are eating.	The sheep is eating.
_____8. The deer is sitting.	The deer are sitting.
_____9. The paint spilled.	The paint is spilling.
____10. The boy is jumping.	The boy jumped.
____11. The girl is drinking.	The girl will drink.
____12. The baby is climbing.	The baby will climb.
____13. The girl is not cooking.	The girl is cooking.
____14. The match is burning.	The match is not burning.
____15. The duck pulls the boat.	The boat pulls the duck.
____16. The girl washes the boy.	The boy washes the girl.
____17. The train is bumped by the car.	The car is bumped by the train.
____18. The Mommy is kissed by the Daddy.	The Daddy is kissed by the Mommy.

SYNTAX RECORD--FORM A, Page 2

____19.	The girl shows the rabbit the bear.	The girl shows the bear the rabbit.
____20.	The boy brings the bird the fish.	The boy brings the fish the bird.
____21.	Their wagon	His wagon
____22.	Their dog	Her dog
____23.	The cat chases the dog.	The dog chases the cat.
____24.	The boy feeds the girl.	The girl feeds the boy.
____25.	The dog bites.	The cat bites.
____26.	The boy pushes.	The girl pushes.
____27.	The girl waves.	The girls wave.
____28.	The kittens play.	The kitten plays.
____29.	The boys pull the boat.	The boy pulls the boat.
____30.	The girl rides the horse.	The girls ride the horse.
____31.	will sweep the floor	sweeps the floor
____32.	holds the hammer	will hold the hammer
____33.	The boy throws the bear.	The boy throws the dolly.
____34.	The girl holds the dog.	The girl holds the cat.

Form 10/20/64

SYNTAX RECORD--FORM B

Date__________

Time Stopped__________

Examiner's Name____________________

Time Started__________

Total Time__________

Child's Name______________School__________Teacher______________

____1.	A string	Some string
____2.	A paper	Some paper
____3.	The boys draw on the board.	The boy draws on the paper.
____4.	The dog digs in the dirt.	The dogs dig in the water.
____5.	The deer runs into the woods.	The deer run into the bar.
____6.	The sheep jumps over the fence.	The sheep jump over the water.
____7.	The sheep are eating.	The sheep is eating.
____8.	The deer is sitting.	The deer are sitting.
____9.	The paint spilled on the floor.	The paint is spilling on the truck.
____10.	The boy is jumping over the truck.	The boy jumped over the box.
____11.	The girl is drinking the water.	The girl will drink the pop.
____12.	The baby is climbing the steps.	The baby will climb the hill.
____13.	The girl is not cooking.	The girl is cooking.
____14.	The match is burning.	The match is not burning.
____15.	The duck pulls the boat in the water.	The boat pulls the duck in the rain.

SYNTAX RECORD--FORM B, Page 2

____16.	The girl washes the boy on the neck.	The boy washes the girl on the nose.
____17.	The train is bumped by the car.	The car is bumped by the train.
____18.	The Mommy is kissed by the Daddy.	The Daddy is kissed by the Mommy.
____19.	The girl shows the rabbit the bear.	The girl shows the bear the rabbit.
____20.	The boy brings the bird the fish.	The boy brings the fish the bird.
____21.	Their wagon is blue.	His wagon is red.
____22.	Their dog is red.	Her dog is brown.
____23.	The cat chases the dog very fast.	The dog chases the cat very slowly.
____24.	The boy feeds the girl very fast.	The girl feeds the boy very slowly.
____25.	The dog bites very hard.	The cat bites very easily.
____26.	The boy pushes very hard.	The girl pushes very easily.
____27.	The girl waves after school.	The girls wave before school.
____28.	The kittens play after dinner.	The kitten plays before dinner.
____29.	Before school the boys pull the boat.	After school the boy pulls the boat.
____30.	After the storm the girl rides the horse.	Before the storm the girls ride the horse.
____31.	will sweep the floor	sweeps the floor
____32.	holds the hammer	will hold the hammer
____33.	The boy throws the bear.	The boy throws the dolly.
____34.	The girl holds the dog.	The girl holds the cat.

APPENDIX H

Morphology Record--
Used to Record Oral Language
Responses of Children

MORPHOLOGY RECORD

Date__________

Time Stopped__________

Examiner's Name________________________

Time Started__________

Total Time__________

Child's Name____________ School____________ Teacher_____________

1. __________________
2. __________________
3. __________________
4. __________________
5. __________________
6. __________________
7. __________________
8. __________________
9. __________________
10. __________________
11. __________________
12. __________________
13. __________________
14. __________________
15. __________________
16. __________________
17. __________________
18. __________________
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31. __________________
32. __________________
33. __________________
34. __________________
35. __________________
36. __________________
37. __________________
38. __________________
39. __________________
40. __________________
41. __________________
42. __________________
43. __________________
44. __________________
45. __________________

APPENDIX I

Sample Record Sheet for Books Read by Children

MY READING LIST

BOOKS I HAVE READ

MY NAME____

MY TEACHER'S NAME________________________________

MY SCHOOL______________________________________

1____

2____

3____

4____

5____

6____

7____

8____

9____

10____

11____

12____

13____

14____

15____